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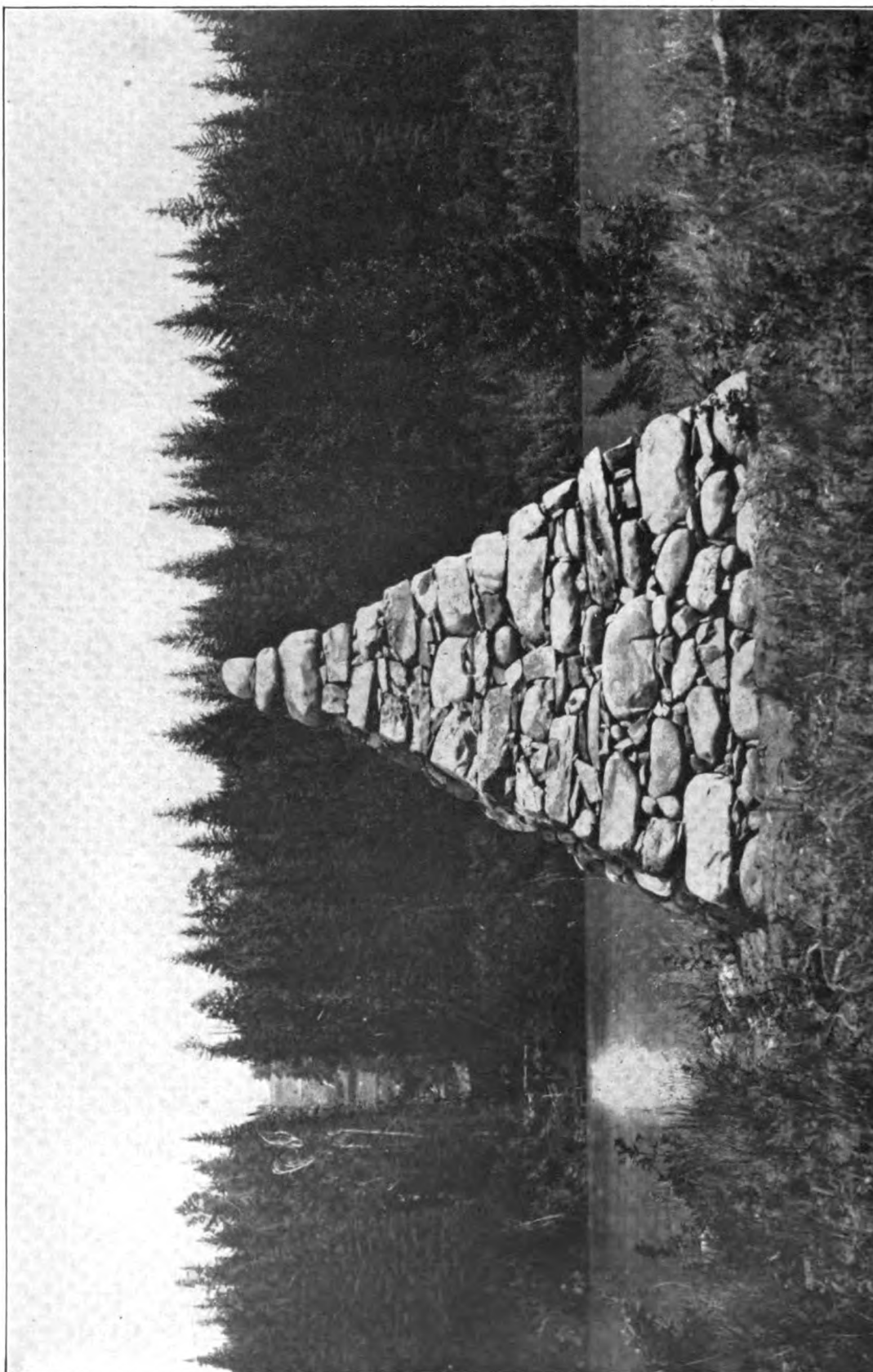


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VISTA AND ORIGINAL BOUNDARY CAIRN 152 ON THE WEST BANK OF THE KOOTENAI RIVER. THE CAIRN WAS ERECTED BY THE UNITED STATES SECTION OF THE COMMISSION IN 1860. IT IS NOW REPLACED BY MONUMENT 243. PHOTOGRAPH BY THE BRITISH SECTION OF THE COMMISSION IN 1861

INTERNATIONAL BOUNDARY COMMISSION.

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## JOINT REPORT

UPON THE

## SURVEY AND DEMARCATION OF THE BOUNDARY

BETWEEN THE

## UNITED STATES AND CANADA

FROM THE GULF OF GEORGIA TO THE  
NORTHWESTERNMOST POINT OF LAKE OF THE WOODS

---

IN ACCORDANCE WITH THE PROVISIONS OF ARTICLES VI AND VII OF THE TREATY  
SIGNED AT WASHINGTON APRIL 11, 1908, AND ARTICLES I, II, AND IV OF  
THE TREATY SIGNED AT WASHINGTON FEBRUARY 24, 1925

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HIS BRITANNIC MAJESTY'S COMMISSIONER

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UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1937

**PUBLISHED UNDER THE AUTHORITY OF  
THE INTERNATIONAL BOUNDARY  
COMMISSIONERS**



LETTER OF TRANSMITTAL

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WASHINGTON, *October 27, 1937.*

The Honorable

The SECRETARY OF STATE OF THE UNITED STATES,  
Washington.

The Right Honorable

The SECRETARY OF STATE FOR EXTERNAL AFFAIRS OF CANADA,  
Ottawa.

SIRS:

We have the honor to submit herewith our printed joint report upon the reestablishment of the section of the International Boundary between the United States and Canada from the Gulf of Georgia to the Northwesternmost Point of Lake of the Woods, together with an atlas of fifty-nine signed joint maps of the boundary as now reestablished, in accordance with the provisions of Articles VI and VII of the treaty between the United States and Great Britain signed at Washington April 11, 1908, and of Articles I, II, and IV of the treaty between the United States and His Britannic Majesty in respect of Canada signed at Washington February 24, 1925.

This report is the sixth of a series of seven final reports being prepared by the Commissioners on the survey and demarcation of the several sections of the International Boundary Line between the United States and Canada and Alaska and Canada in accordance with the provisions of existent boundary treaties. The seven reports, together with their accompanying maps, will cover the entire boundary between the United States and Canada and between Alaska and Canada, with the exception of that part of the boundary, through the St. Lawrence River and the Great Lakes, which was reestablished and reported upon by the International Waterways Commission, under the special provisions of Article IV of the treaty of April 11, 1908.

The signed originals of the report and the originals of each of the fifty-nine boundary maps have been prepared in quadruplicate and two of the original reports and two sets of the original maps, bound in atlas form, are transmitted herewith to each Government.

Very truly yours,



*United States Commissioner.*



*His Britannic Majesty's Commissioner.*



## CONTENTS

	Page
Introduction.....	XIII
Treaties of 1908 and 1925, appointments of the Commissioners, and reservation of lands along the International Boundary.....	1
Treaty between the United States of America and the United Kingdom concerning the boundary between the United States and the Dominion of Canada from the Atlantic Ocean to the Pacific Ocean.....	1
Article I. The boundary through Passamaquoddy Bay.....	1
Article II. The boundary from the mouth to the source of the St. Croix River..	3
Article III. The boundary from the source of the St. Croix River to the St. Lawrence River.....	5
Article IV. The boundary from its intersection with the St. Lawrence River to the mouth of Pigeon River.....	6
Article V. The boundary from the mouth of Pigeon River to the Northwesternmost Point of the Lake of the Woods.....	7
Article VI. The boundary from the Northwesternmost Point of the Lake of the Woods to the summit of the Rocky Mountains.....	7
Article VII. The boundary from the summit of the Rocky Mountains to the Gulf of Georgia.....	8
Article VIII. The boundary from the forty-ninth parallel to the Pacific Ocean..	9
Article IX. General provisions.....	9
Article X.....	10
Treaty between the United States of America and His Britannic Majesty, in respect of the Dominion of Canada, to define more accurately at certain points and to complete the International Boundary between the United States and Canada and to maintain the demarcation of that boundary.....	11
Article I.....	11
Article II.....	12
Article III.....	13
Article IV.....	14
Article V.....	15
Appointments of the Commissioners under concurrent action of 1902-1903 and under the treaty of 1908:	
Dr. W. F. King for His Britannic Majesty.....	16
Messrs. O. H. Tittmann and Charles D. Walcott for the United States.....	17
Mr. O. H. Tittmann for the United States.....	17
Dr. W. F. King for His Britannic Majesty.....	18
Mr. E. C. Barnard for the United States.....	18
Mr. J. J. McArthur for His Britannic Majesty.....	19
Mr. E. Lester Jones for the United States.....	19
Mr. J. D. Craig for His Britannic Majesty.....	20
Mr. James H. Van Wagenen for the United States.....	20
Mr. Noel J. Ogilvie for His Britannic Majesty.....	21
Mr. Thomas Riggs for the United States.....	21

## Treaties of 1908 and 1925—Continued.

Reservation of lands along the International Boundary:	Page
Proclamations by the President of the United States of America.....	22
Action taken by the Provincial Governments of the Dominion of Canada.....	23
Reservations by the Province of British Columbia.....	23
Reservations by the Province of Alberta.....	23
Reservations by the Province of Saskatchewan.....	23
Reservations by the Province of Manitoba.....	23
Agreement of the Commissioners as to the manner in which the provisions of the concurrent action of 1902-1903, of articles VI and VII of the treaty of 1908, and of articles I and II of the treaty of 1925 should be carried out.....	25
Retracement of the boundary line.....	29
Field operations.....	34
Season of 1901—Reconnaissance west of the Rocky Mountains.....	35
Western Canadian party.....	36
Eastern Canadian party.....	38
United States astronomic and topographic parties.....	39
First United States geologic party—Point Roberts to Osoyoos Lake.....	42
Second United States geologic party—West crossing of the Kootenai River to Osoyoos Lake.....	44
Third United States geologic party—Kootenai River at Porthill, Idaho, to summit of the Rocky Mountains.....	45
Season of 1902—Reconnaissance west of the Rocky Mountains.....	47
Western Canadian party—Point Roberts.....	47
Eastern Canadian party—Similkameen River to South Fork of Salmon River..	47
Season of 1903—South Fork of Salmon River to the summit of the Rocky Mountains..	48
Canadian party—West of Porthill, Idaho.....	48
United States parties.....	50
Astronomic party.....	50
First astronomic subparty.....	51
Second astronomic subparty.....	51
Third astronomic subparty.....	52
Topographic party.....	53
First topographic subparty.....	54
Second topographic subparty.....	57
Third topographic subparty.....	58
Fourth topographic subparty—Leveling.....	58
Season of 1904—Skagit River to the summit of the Rocky Mountains.....	59
Canadian party.....	59
United States parties.....	62
Astronomic party.....	62
First astronomic subparty.....	62
Second astronomic subparty.....	63
Third astronomic subparty.....	64
Topographic party.....	65
Line projection subparty.....	65
Triangulation subparty.....	66
Topographic and vista-cutting subparty.....	67

# CONTENTS

VII

Field operations—Continued.	Page
Season of 1905—Detached sections west of the summit of the Rocky Mountains...	70
Canadian parties	70
Line party	70
Western trail- and vista-cutting party	72
Topographic party	72
Monumenting parties	72
Triangulation party	73
United States parties	73
Astronomic party	73
Triangulation subparty	73
Monumenting subparty	75
Topographic party	76
Triangulation subparty	76
Monumenting subparty	77
Level subparty	77
Season of 1906—Point Roberts to the Skagit River	79
Canadian party	79
First subparty	79
Main party	81
Second subparty	81
Main party	82
Third subparty	83
Main party	83
Season of 1907—Point Roberts to the Skagit River; and joint inspection west of the Rocky Mountains	86
Canadian parties	86
Triangulation subparty	87
Second subparty	87
Main party	87
Third subparty	88
Fourth subparty	88
Monumenting parties	88
Joint inspection party	89
Season of 1908—Conclusion of work west of the Rocky Mountains; and the boundary from Coutts, Alberta, 100 miles eastward to Lodge Creek	92
The boundary west of the summit of the Rocky Mountains	92
The boundary east of the summit of the Rocky Mountains	92
Canadian party	93
Season of 1909—From the summit of the Rocky Mountains eastward to Frenchman Creek	93
Canadian party	94
United States party	95
Season of 1910—From the North Fork of Milk River to Coutts, Alberta; from Frenchman Creek to the Middle Fork of Poplar River; and from the West Branch of Short Creek to the east slope of the Turtle Mountains	96
Canadian party	96
United States party	96
Season of 1911—From the Middle Fork of Poplar River to the West Branch of Short Creek; and from the east slope of the Turtle Mountains to Red River:	
Canadian party	98
United States party	99



Field operations—Continued.	Page
Season of 1912—From Red River to Lake of the Woods; the meridian line; and measurement of bases, Rocky Mountains to Lake of the Woods.....	100
Season of 1913—The meridian line and the 49th parallel near Lake of the Woods...	102
Season of 1914—Numbering the monuments.....	103
Seasons of 1917 to 1922—Completion of field operations under the provisions of the treaty of 1908.....	104
Season of 1926 and subsequent thereto—Maintenance under the treaty of 1925....	106
Field and office methods and results:	
Horizontal control.....	114
Monuments and monumenting.....	115
Types of monuments.....	115
The boundary vista.....	126
Topography.....	127
Vertical control.....	128
Field transportation.....	133
The official maps.....	134
Establishment of the point adopted in lieu of the original Northwesternmost Point of Lake of the Woods in accordance with the provisions of the treaty of 1925.....	137
Description and definition of the International Boundary Line from the Gulf of Georgia (Georgia Strait) to the Northwesternmost Point of Lake of the Woods.....	143
Geographic positions of monuments marking the International Boundary from the Gulf of Georgia (Georgia Strait) to the Northwesternmost Point of Lake of the Woods.....	144
Geographic positions of marks and monuments ranging and referencing the International Boundary from the Gulf of Georgia (Georgia Strait) to the Northwesternmost Point of Lake of the Woods.....	160
Conclusion.....	161
Appendix I. Historical sketch.....	163
Explorations of the interior.....	178
Bibliography.....	182
Appendix II. The boundary treaties.....	183
Definitive treaty of peace (1783), Article II.....	183
The Jay Treaty. Treaty of amity, commerce, and navigation (1794), Article IV....	184
Treaty of peace and amity (Treaty of Ghent, 1814), Article VII.....	186
Convention of 1818, Articles II and III.....	187
Convention continuing in force Article III of the Convention of 1818 (1827), Articles I, II, and III.....	188
The Oregon Treaty. Treaty establishing the boundary in the territory on the northwest coast of America lying westward of the Rocky Mountains (1846).....	191
Appendix III. Original surveys and demarcations:	
Boundary west of the summit of the Rocky Mountains.....	194
Adoption of official maps.....	197
Conferences and agreements of the Commissioners of 1857-69.....	198
Final report of the British Commissioner.....	202
Astronomical determinations.....	205
Longitudes and descriptions of monuments.....	205
Official description of the boundary.....	208
Methods and results of field work.....	210
Boundary east of the summit of the Rocky Mountains.....	214
Final proceedings of the Commission.....	216

Appendix IV. Elevations along the 49th Parallel Boundary:	Page
Elevations and descriptions of bench marks .....	218
The Washington-British Columbia Line .....	218
The Idaho-British Columbia Line .....	222
The Montana-British Columbia Line .....	222
The Montana-Alberta Line .....	223
The Montana-Saskatchewan Line .....	226
The North Dakota-Saskatchewan Line .....	234
The North Dakota-Manitoba Line .....	237
The Minnesota-Manitoba Line .....	239
Useful elevations .....	244
The Montana-Alberta Line .....	244
The Montana-Saskatchewan Line .....	245
The North Dakota-Saskatchewan Line .....	247
The North Dakota-Manitoba Line .....	249
Appendix V. Geographic positions and descriptions of triangulation and traverse stations.	253
Explanation of tables .....	253
Geographic positions of triangulation and traverse stations, Georgia Strait to Lake of the Woods, first-order scheme .....	254
Geographic positions of triangulation stations, land survey corners, and forest service lookouts, Georgia Strait to Lake of the Woods, supplementary to first-order scheme .....	263
Geographic positions of triangulation stations, Georgia Strait to Lake of the Woods, major schemes .....	272
Geographic positions of triangulation stations and monuments, Georgia Strait to summit of Rocky Mountains, minor schemes .....	295
Geographic positions of triangulation stations and monuments, summit of Rocky Mountains to Lake of the Woods, minor schemes .....	313
Descriptions of triangulation and traverse stations:	
Georgia Strait to Lake of the Woods, first-order scheme .....	333
Georgia Strait to Lake of the Woods, points supplementary to first-order scheme .....	362
Georgia Strait to Lake of the Woods, major schemes .....	378
Georgia Strait to summit of Rocky Mountains, minor schemes .....	414
Summit of Rocky Mountains to Lake of the Woods, minor schemes .....	426
Triangulation sketches .....	428
Index to triangulation and traverse stations .....	459
General Index .....	473

## ILLUSTRATIONS

Vista and original boundary cairn 152 on west bank of the east crossing of the Kootenai River.....	Frontispiece
Original boundary cairn 356 east of the summit of the Rocky Mountains, now replaced by Monument 331.....	Page 31
One of the earth mounds used to mark the International Boundary on the prairie in 1872-4.....	31
Instrument pier used in 1859-60 at the Senchさい latitude station on Silesia Creek.....	36
Headstone over the grave of Michael Brown, erected by the International Boundary Commission, 1936, with the cooperation of the United States Army.....	37
Original boundary cairn 61, erected in the survey of 1858-62, now replaced by Monument 99.....	43
Organization camp of the boundary survey at Gateway, Montana, 1903.....	50
Original boundary cairn 161 on the summit of the Rocky Mountains, now replaced by Monument 272.....	54
The summit of the Rocky Mountains. The arrow points to boundary monument 272 in the saddle in the foreground.....	54
A difficult climb to "Kintla" triangulation station, Rocky Mountains. Commissioner Riggs as a young surveyor in 1903.....	55
Climbing to a triangulation station in the Rocky Mountains.....	55
The boundary vista, looking east across the Flathead River valley.....	57
Cathedral Peak, a bald granite summit of the Cascade Mountains, just south of the International Boundary, used as a triangulation station.....	66
On the way with the pack train; in the Cascade Mountains.....	68
Packing up camp at Park Pass in the Cascade Mountains.....	69
Glacier Peak, Cascade Mountains, a triangulation station 2 miles south of the International Boundary.....	71
A cedar log used as a bridge on the Skagit River.....	77
Transporting the sections of an aluminum-bronze monument over a difficult bit of trail in the Cascade Mountains.....	78
Tamihi Mountain, between Silesia and Middle Creeks, Cascade Mountains.....	80
Looking northeast from Red Mountain triangulation station in the Cascade Mountains. The prominent peak on the left is Tamihi Mountain; the boundary vista ascending the eastern slope of the Silesia Creek valley is seen on the right.....	82
Looking northeast across Middle Creek from a point 1 mile northeast of boundary monument 56, Cascade Mountains.....	84
A high peak of the Cascade Range used as a phototopographic station, 1 mile east of Middle Creek and 1½ miles north of boundary monument 58.....	85
Triangulation station "Middle", in the Cascade Mountains, is on the high peak seen on the left.....	86
A view of the summits of the Cascade Mountains, looking east across the valley of Silesia Creek from triangulation station "Red" on the summit of Red Mountain.....	88
Setting a cast-iron boundary monument in the prairie country.....	94
Chief Mountain, the most easterly peak of the Rocky Mountains in the vicinity of the International Boundary. It marks an angle point of the eastern boundary of Glacier National Park.....	95

	Page
Fording the Souris River near the International Boundary. Note the bags on the horses' noses to protect them from the vicious "nose flies" of the prairies.....	97
Observing from a boundary monument. Note special device for mounting the theodolite.....	98
A bit of old Europe transplanted to Manitoba near the International Boundary.....	99
A triangulation station tower on the Minnesota-Manitoba boundary.....	100
A Boundary Commission survey camp on the prairie east of Red River, 1912.....	101
Boats were used for transportation on Lake of the Woods.....	102
A boundary line station on a cedar stump between Monuments 6 and 7.....	105
Triangulation signal on a mountain summit where material was scarce.....	109
Locating a range mark site in Boundary Bay, off Blaine, Washington.....	110
A Boundary Commission survey camp in the Cascade Mountains during a summer snow storm.....	111
The Peace Portal; on the International Boundary at the crossing of the Pacific Highway on the east shore of Boundary Bay.....	113
Original monument 53, now replaced by Monument 849, one of the cast-iron monuments set in the Red River valley by the Commission of 1872-76.....	118
Typical cast-iron monument used on the prairie sections of the boundary; bench-mark post in the base.....	119
East Reference Monument, at the Northwesternmost Point of Lake of the Woods.....	120
Typical aluminum-bronze sectional monument used on the mountain sections of the boundary. Commissioner Ogilvie as a young surveyor in 1908.....	120
Monument 711-B, showing type of monument used in pairs to mark the boundary at important highway crossings.....	121
Monuments 165-A and 165-B set one on each side of the highway crossing the boundary at Laurier, Washington.....	121
Monument 0 (zero) at high-water mark on the west shore of Point Roberts, Georgia Strait.....	122
Monument 1, the granite monument erected on Point Roberts in 1861.....	122
Offshore range mark on the west side of Point Roberts.....	123
Shore range mark, east side of Boundary Bay, and observing tower over Monument 5.....	123
Offshore range mark, east side of Boundary Bay.....	124
Type of monument used for Monument 19-A.....	124
Lions Clubs monument, No. 832-A, near Emerson, Manitoba.....	125
The boundary vista, looking east toward Monument 249, east of Gateway, Montana.....	126
Topographic rodman working on horseback on the prairie.....	127
Topographic mapping with the plane table in the Cascade Mountains.....	127
Teams and wagons were used for transportation on the prairie.....	133
Old tripod at head of Northwest Angle Inlet erected by boundary survey of 1872-1876.....	141
The boundary line east from Monument 31. The two vistas on the far ridge illustrate a great deflection of the line due to "station error" of latitude stations.....	212

## MAPS, DRAWINGS, AND TRIANGULATION SKETCHES

Figure 1. General type cast-iron monument.....	116
2. General type aluminum-bronze monument.....	116
3. General type concrete monument for highway crossings.....	116
4. Special granite monument erected 1861.....	116
5. Special concrete monument with bronze post.....	116
6. Shore range-mark tower.....	117
7. Offshore range-mark tower.....	117
8. Special concrete monument with bronze disk.....	117
9. Special concrete monument, inscription on base.....	117

	Page
Map of the vicinity of the Northwesternmost Point of Lake of the Woods.....	138
Sketch 1. Triangulation, first-order scheme, longitude 122°-125°.....	428
2. Triangulation, first-order scheme, longitude 119°-122°.....	429
3. Triangulation, first-order scheme, longitude 116°-119°.....	430
4. Triangulation, first-order scheme, longitude 113°-116°.....	431
5. Triangulation, first-order scheme, longitude 110°-113°.....	432
6. Triangulation, first-order scheme, longitude 107°-110°.....	433
7. Triangulation, first-order scheme, longitude 104°-107°.....	434
8. Triangulation, first-order scheme, longitude 101°-104°.....	435
9. Triangulation, first-order scheme, longitude 98°-101°.....	436
10. Triangulation and traverse, first-order scheme, longitude 95°-98°.....	437
11. Triangulation, major and minor schemes, longitude 122°30'-123°20'.....	438
12. Triangulation, major and minor schemes, longitude 121°00'-122°40'.....	439
13. Triangulation, major and minor schemes, longitude 119°00'-121°00'.....	440
14. Triangulation, major and minor schemes, longitude 118°00'-119°00'.....	441
15. Triangulation, major and minor schemes, longitude 116°00'-118°00'.....	442
16. Triangulation, major and minor schemes, longitude 114°00'-116°00'.....	443
17. Triangulation, major and minor schemes, longitude 112°00'-114°00'.....	444
18. Triangulation, major and minor schemes, longitude 110°00'-112°00'.....	445
19. Triangulation, major and minor schemes, longitude 108°00'-110°00'.....	446
20. Triangulation, major and minor schemes, longitude 106°00'-108°00'.....	447
21. Triangulation, major and minor schemes, longitude 105°00'-106°00'.....	448
22. Triangulation, major and minor schemes, longitude 104°00'-105°00'.....	449
23. Triangulation, major and minor schemes, longitude 103°00'-104°00'.....	450
24. Triangulation, major and minor schemes, longitude 101°30'-103°00'.....	451
25. Triangulation, major and minor schemes, longitude 100°00'-101°30'.....	452
26. Triangulation, major and minor schemes, longitude 98°30'-100°00'.....	453
27. Triangulation, major and minor schemes, longitude 97°30'-98°30'.....	454
28. Triangulation, major and minor schemes, longitude 97°00'-97°30'.....	455
29. Triangulation, major and minor schemes, longitude 95°00'-97°00'.....	456
30. Triangulation and traverse, major and minor schemes, Forty-ninth Parallel to Northwest Angle Inlet.....	457

## INTRODUCTION

The report herewith submitted covers the reestablishment and remonumenting of the International Boundary Line between the United States of America and the Dominion of Canada from the Gulf of Georgia (Georgia Strait) to the Northwesternmost Point of Lake of the Woods. It has been prepared in accordance with the requirements and provisions of articles VI and VII of the treaty concluded between the United States and Great Britain April 11, 1908. The report includes a complete account of the field and office work done by the Commissioners and a certified description and definition of this section of the boundary line.

The boundary line, surveyed and marked and herein described and defined, is a reestablishment of parts of the International Boundary adopted under article II of the Convention of London of 1818, under article II of the Webster-Ashburton Treaty of 1842, and under article I of the treaty of 1846. It conforms with the articles of the above treaties except as modified by articles I and II of the treaty of 1925.

The boundary begins at the eastern shore of Georgia Strait and follows the original astronomic determination of the parallel of 49° of north latitude to a point in Lake of the Woods, whence it runs north to the point in Northwest Angle Inlet of Lake of the Woods described in article I of the treaty of 1925.<sup>1</sup> The part of the line which follows the astronomic determination of the forty-ninth parallel is commonly called the 49th parallel land boundary and the north-and-south portion of it is generally referred to as the meridian boundary.

Beginning at tidewater, the line crosses the main continental divide, and extends for nearly 1,300 miles inland to the heart of the continent. The country traversed varies greatly in physical features, climate, and vegetation and so, correspondingly, varies in natural and economic resources and accessibility. These variations have had effect on the settlement and occupancy of the adjacent territory and so upon the need and method of defining and marking the boundary itself.

Historically as well as geographically the boundary from Georgia Strait to the Northwesternmost Point of Lake of the Woods is divided by the summit of the Rocky Mountains into two parts, which for convenience are referred to as "west of the summit of the Rocky Mountains" and "east of the summit of the Rocky Mountains."

The lengths of these parts of the boundary are: 49th parallel land boundary west of the summit of the Rocky Mountains, 410.2 miles; 49th parallel boundary east of the summit of the Rocky Mountains, 860.0 miles; meridian boundary, 26.7 miles; a total of 1,296.9 miles.

The border Provinces and States from west to east are the Provinces of British Columbia, Alberta, Saskatchewan, and Manitoba on the north and the States of Washington, Idaho, Montana, North Dakota, and Minnesota on the south.

<sup>1</sup> Treaty of 1925, p. 11; map, p. 138.

The boundary west of the summit of the Rocky Mountains was adopted under article I of the treaty of 1846. It was first determined and marked upon the ground in 1857-61 by Commissioners representing the Governments of the United States and Great Britain.<sup>2</sup> The boundary as laid down by the Commissioners was shown by them on a series of maps, seven in number, accompanied by an index map. The maps are dated May 7, 1869, and are signed by the Commissioners and surveyors of the respective Governments. The maps and "the marks by which the boundary to the eastern shore of the Gulf of Georgia has been defined upon the ground" were approved, agreed to, and adopted through a declaration to that effect signed on February 24, 1870, for the United States by Hamilton Fish, Secretary of State, and for Great Britain by Sir Edward Thornton, Minister to the United States.

At the time the Commissioners of 1857-69 marked the boundary, the country adjacent thereto was sparsely inhabited and, in the high mountainous sections, settlement appeared to be unlikely to soon occur. Taking into consideration the great expenditure of time and money that would be required to completely mark the boundary through the heavily timbered and mountainous country, the Commissioners marked the line only through settled regions and at prominent stream crossings. The intervals between marked sections were in some cases as much as 25 miles. As transportation facilities improved and increased, the country on both sides of the boundary became more populated, demanding a more definite and complete marking on the ground. In 1898 questions as to the adequacy of the markings of this boundary began to arise; in 1899 similar problems arose regarding the New York-Quebec line. In 1900 the Privy Council of Canada adopted a report (approved May 26, 1900) proposing that the two Governments join in making an examination of and in re-marking where necessary "the whole of the southern boundary of Canada, wherever it has been surveyed by the various commissions appointed for that purpose."

The questions regarding the boundary from Georgia Strait to the summit of the Rocky Mountains being the most urgent, a joint examination of it was made in 1901 and 1902. In 1902 and 1903 an agreement was reached through an exchange of notes providing for retracing and remonumenting it under concurrent action, which was done in the years 1903 to 1908. Finally, the treaty of 1908 was adopted providing for the more complete definition and demarcation of the International Boundary between the United States and the Dominion of Canada from the Atlantic Ocean to the Pacific Ocean.

The boundary from the summit<sup>3</sup> of the Rocky Mountains to the Northwesternmost Point of Lake of the Woods was first adopted under article II of the Convention of London of 1818 and was again described, as "according to existing treaties", in article II of the Webster-Ashburton Treaty of 1842. The terminus at the Northwesternmost Point of Lake of the Woods was modified by the treaty of 1925 "in order to provide for a more practical definition of the boundary."

<sup>2</sup> For methods of determining and marking, see p. 210.

<sup>3</sup> See discussion relative to summit (appendix III, p. 196.)

The boundary east of the Rocky Mountains passes over the vast expanse of the Great Plains section of the continent, where a rigorous climate delayed settlement to a period later than that of the country west of the mountains. The plains section was first surveyed<sup>4</sup> and marked in 1872-75, the work being done jointly by Commissioners appointed by the two Governments. The open character of the country rendered operations comparatively simple and the line was surveyed and marked at frequent intervals. Many of the marks, however, were nothing more than mounds of earth or cairns, and by 1908 they had deteriorated so greatly that they were scarcely recognizable. It was evident that monuments of a more conspicuous and permanent character were needed for effective demarcation. Gradually increasing settlement gave rise, also, to a demand for more frequent marks.

After completing the reestablishment and remonumenting of this section of the boundary in 1914, several minor surveys, necessary to complete the records, were made on the line both east and west of the summit of the Rocky Mountains.

Maintenance has been carried on under the provisions of article IV of the treaty of 1925.

The operations of the Commissioners in carrying out the instructions of their Governments under the concurrent action of 1902-3, the provisions of articles VI and VII of the treaty of 1908, and, later, the provisions of articles I, II, and IV of the treaty of 1925 are fully set forth in this report.

The duties of the Commissioners were increased from time to time up to 1908 until they embraced the work of surveying and marking the entire boundary between the United States and Canada and between Alaska and Canada, with the exception of that portion of the line through the St. Lawrence River and the Great Lakes,<sup>5</sup> resulting at times in the breaking of the continuity of both field and office work on a particular section of the boundary in order to best serve immediate wants elsewhere. This explains the lapse of time between the date of printing the first of the series of charts or maps and the date of printing the last of the series. The delay in the publication of this report was due in part to the same causes, and in part to the fact that about the time of the completion of the maps, arrangements were being perfected between the United States Coast and Geodetic Survey and the Geodetic Survey of Canada to carry a belt of first-order triangulation along the International Boundary from the Pacific Ocean to Lake Superior. The completion of this work was awaited to enable the Commissioners to publish the geodetic positions of the boundary marks on the latest North American datum.

<sup>4</sup> For method of ascertaining and marking see p. 217.

<sup>5</sup> Article IV of the treaty of 1908 expressly provides for the International Waterways Commission to "ascertain and reestablish" the International Boundary through the St. Lawrence River and the Great Lakes.





# TREATIES OF 1908 AND 1925, APPOINTMENTS OF THE COMMISSIONERS, AND RESERVATION OF LANDS ALONG THE INTERNATIONAL BOUNDARY

## TREATY BETWEEN THE UNITED STATES OF AMERICA AND THE UNITED KINGDOM CONCERNING THE BOUNDARY BETWEEN THE UNITED STATES AND THE DOMINION OF CANADA FROM THE ATLANTIC OCEAN TO THE PACIFIC OCEAN

*Signed at Washington, April 11, 1908*

*(Ratifications exchanged at Washington, June 4, 1908)*

The United States of America and His Majesty Edward the Seventh, of the United Kingdom of Great Britain and Ireland, and of the British Dominions beyond the Seas, King, and Emperor of India, being desirous of providing for the more complete definition and demarcation of the international boundary between the United States and the Dominion of Canada, have for that purpose resolved to conclude a treaty, and to that end have appointed as their Plenipotentiaries:

The President of the United States of America, Elihu Root, Secretary of State of the United States; and

His Britannic Majesty, Right Honorable James Bryce, O. M., his Ambassador Extraordinary and Plenipotentiary at Washington;

Who, after having communicated to each other their respective full powers, which were found to be in due and proper form, have agreed to and concluded the following articles:

### ARTICLE I

#### THE BOUNDARY THROUGH PASSAMAQUODDY BAY

The High Contracting Parties agree that each shall appoint, without delay, an expert geographer or surveyor to serve as Commissioners for the purpose of more accurately defining and marking the international boundary line between the United States and the Dominion of Canada in the waters of Passamaquoddy Bay from the mouth of the St. Croix River to the Bay of Fundy, and that in defining and marking said boundary line the Commissioners shall adopt and follow, as closely as may be, the line surveyed and laid down by the Commissioners appointed under Article II of the Treaty of July 22, 1892, between the United States and Great Britain, so far as said Commissioners agreed upon the location of said line, namely:

(1) From a point at the mouth of the St. Croix River defined by the ranges established by them, by a connected series of six straight lines defined by ranges and cross ranges, to a point between Treat Island and Friar Head, likewise defined by ranges and cross ranges established by them; and also

(2) From a point in Quoddy Roads, defined by the intersection of the range passing through the position of the Beacon of 1886 and Lubec Channel Light, with a range established by them on the west shore of Quoddy Roads along the course of this latter range, which is about 80° 35' east of true south, into the Bay of Fundy.

In ascertaining the location of the above-described line, the Commissioners shall be controlled by the indications of the range marks and monuments established along its course by said former Commissioners and by the charts upon which the said Commissioners marked the line as tentatively agreed upon by them.

The remaining portion of the line, lying between the two above-described sections, and upon the location of which said former Commissioners did not agree, shall pass through the center of the Lubec Narrows Channel between Campo Bello Island and the mainland, and, subject to the provisions hereinafter stated, it shall follow on either side of the said Narrows such courses as will connect with the parts of the line agreed upon as aforesaid, and such boundary shall consist of a series of straight lines defined by distances and courses; but inasmuch as differences have arisen in the past as to the location of the line with respect to Pope's Folly Island above Lubec Narrows and with respect to certain fishing grounds east of the dredged channel below Lubec Narrows, it is agreed that each of the High Contracting Parties shall present to the other within six months after the ratification of this Treaty a full printed statement of the evidence, with certified copies of original documents referred to therein which are in its possession, and the arguments upon which it bases its contentions, with a view to arriving at an adjustment of the location of this portion of the line in accordance with the true intent and meaning of the provisions relating thereto of the treaties of 1783 and 1814 between the United States and Great Britain, and the award of the Commissioners appointed in that behalf under the treaty of 1814; it being understood that any action by either or both Governments or their representatives authorized in that behalf or by the local governments on either side of the line, whether prior or subsequent to such treaties and award, tending to aid in the interpretation thereof, shall be taken into consideration in determining their true intent and meaning. Such agreement, if reached, shall be reduced to writing in the form of a protocol and shall be communicated to the said Commissioners, who shall lay down and mark this portion of the boundary in accordance therewith and as herein provided.

In the event of a failure to agree within six months after the date of exchanging the printed statements aforesaid, the question of which Government is entitled to jurisdiction over such island and fishing grounds under treaty provisions, and proceedings thereunder, interpreted in accordance with their true intent and meaning as above provided, and by reason of any rights arising under the recognized principles of international law, shall be referred forthwith for decision upon the evidence and arguments submitted as aforesaid, with such additional statement of facts as may be appropriate, and an argument in reply on each side, to an arbitrator to be agreed upon by the two Governments, or, in case of a failure to agree, to be appointed by a third Power selected by the two Governments by common accord, or, if no agreement is thus arrived at, each Government shall select a different Power and the choice of the arbitrator shall be made in concert by the Powers thus selected. The decision of such arbitrator shall be final, and the line shall be laid down and marked by the said Commissioners in accordance therewith and as herein provided.

The arbitrator shall be requested to deliver, together with his award, a statement of all the costs and expenses incurred by him in connection with the arbitration, which shall forthwith be repaid by the two Governments in equal moieties.

It is further agreed that if, under the foregoing provisions, the boundary be located through the channel to the east of the dredged channel above mentioned, the latter shall be equally free and open for the passage of ships, vessels, and boats of both parties.

The entire boundary shall be marked by permanent range marks established on land and, if desirable in the opinion of Commissioners, by buoys in the water, so far as practicable, and by such other boundary marks and monuments and at such points as the Commissioners may determine to be necessary; but the said Commissioners shall proceed to define and mark and chart the portion of the line agreed upon by the former Commissioners under the Treaty of 1892 aforesaid without waiting for the final determination of the location of the remaining portion of the line.

The course of the said boundary line as defined and marked as aforesaid shall be laid down by said Commissioners on quadruplicate sets of accurate modern charts prepared or adopted by them for that purpose, which charts shall be certified and signed by the Commissioners, and two duplicate originals thereof shall be filed by them with each Government; and they shall also prepare in duplicate and file with each Government a joint report or reports under their hands and seals describing in detail the course and location of the boundary line and the range marks and monuments and buoys marking it.

The line so defined and laid down shall be taken and deemed to be the international boundary from the Bay of Fundy to the mouth of the St. Croix River, as established by treaty provisions and the proceedings thereunder.

## ARTICLE II

### THE BOUNDARY FROM THE MOUTH TO THE SOURCE OF THE ST. CROIX RIVER

Whereas Article II of the Treaty of 1783 between the United States and Great Britain provides that a line drawn along the middle of the River St. Croix from its mouth in the Bay of Fundy to its source shall be, between those points, the international boundary between the United States and the British possessions in North America, and the identity of the River St. Croix has been determined by the Commissioners appointed for that purpose under Article V of the Treaty of 1794 between the United States and Great Britain, and the location of the mouth and the source of said river has been duly established, and the course of said river has been described, surveyed, and charted by said Commissioners, as appears from their joint report dated the 25th day of October, 1798, and from the chart or plan of said river prepared and filed by them with said report, but said line of boundary along the middle of said river was not laid down by them on said chart or plan, and was not marked or monumented by them along the course of said river; and whereas, pursuant to an additional article, dated March 15, 1798, supplementing the provisions of the Treaty of 1794 above referred to, a monument was erected by joint action of the two Governments marking the source of the River St. Croix, but said line of boundary through the River St. Croix has not otherwise been monumented and has never been laid down on charts by joint action of the two Governments: therefore, in order to complete and render thoroughly effective the demarcation of the boundary described and established as aforesaid,

It is agreed that each of the High Contracting Parties shall appoint, without delay, an expert geographer or surveyor as a Commissioner, and the Commissioners so appointed shall jointly lay down upon accurate modern charts, to be prepared or adopted by them for that purpose, the line of boundary along the middle of the River St. Croix from its mouth to its source as defined and established by the existing treaty provisions and the proceedings thereunder, above referred to, with the agreed understanding, however, that the line of boundary through said river shall be a water line throughout and shall follow the center of the main channel or thalweg as naturally existing, except where such course would change, or disturb, or conflict with the national character of an island as already established by mutual recognition and acquiescence, in which case the line shall pass on the other side of any such island, following the middle of the channel nearest thereto, or, if the Commissioners find that the national character of any island is in dispute, the question of its nationality shall be submitted by them to their respective Governments, with a chart or map certified jointly by said Commissioners, showing the depth and volume of the water at its high and low stages between such island and the river banks on each side and indicating the course of the main channel of the river as it passes such island, together with a descriptive statement by said Commissioners showing the reasons for selecting such channel as the main channel; and in all such cases the High Contracting Parties agree that the location of the boundary with respect to each island in dispute shall be determined and settled in accordance with the following rules:

(1) The nationality of each island in dispute shall be determined by the predominance of the claims established on either side to such island, arising from the exercise of jurisdiction and

sovereignty over it, including such exercise of jurisdiction by the local governments on either side of the line.

(2) The burden of proving the nationality of any such island shall be upon the party seeking to change the general course of the boundary as above prescribed so as to include such island on its own side of the boundary.

(3) The selection by the Commissioners of the main channel passing such island shall not be conclusive upon the parties hereto and is subject to review, but the burden of proving the main channel to be other than the one selected shall be upon the party proposing the change.

The Government proposing such change in the prescribed course of the boundary shall, upon the submission of the question of the nationality of any island or islands by the Commissioners as aforesaid, promptly present to the other Government a printed statement, with certified copies of any original documents in its possession referred to therein, showing the grounds and arguments upon which its claim of jurisdiction and ownership with respect to such island rests. Unless an agreement is reached upon the presentation of such statement, the Government to which such statement is presented shall within six months after its receipt present in reply a similar statement showing the grounds and arguments upon which the claims of the other Government are contested. If an agreement is reached between the two Governments, it shall be reduced to writing in the form of a protocol and shall be communicated to the said Commissioners, who shall proceed to lay down and mark the boundary so as to leave such island on the side of the boundary to which it is shown it belongs, in accordance with the determination of its nationality arrived at as aforesaid.

In the event of a failure by the two Governments to come to an agreement within six months after the presentation of the printed statements in reply herein above provided for, then the question of the nationality of the islands in dispute shall be referred forthwith for decision under the rules herein above set forth for the determination of that question, and under the recognized principles of international law not inconsistent therewith, and upon the evidence and arguments submitted as aforesaid, with such additional statement of facts as may be appropriate, and such further printed argument on each side as may be desired, to an arbitrator to be agreed upon by the two Governments, or, in case of a failure to agree, to be appointed by a third Power selected by the two Governments by common accord, or, if no agreement is thus arrived at, each Government shall select a different Power and the choice of the arbitrator shall be made in concert by the Powers thus selected. The decision of such arbitrator shall be final, and the line shall be laid down and marked by the said Commissioners in accordance therewith and as herein provided.

The arbitrator shall be requested to deliver, together with his award, a statement of all the costs and expenses incurred by him in connection with the arbitration, which shall forthwith be repaid by the two Governments in equal moieties.

It is further agreed that so far as practicable the said Commissioners shall establish boundary monuments and ranges and buoys marking the course and location of the said line, and showing on which side of the boundary the several islands lying in said river belong, wherever in their judgment it is desirable that the boundary be so marked.

The charts upon which the boundary is marked as aforesaid shall be in quadruplicate, and shall be certified and signed by said Commissioners, and two duplicate originals thereof shall be filed by them with each Government, and it shall also be the duty of said Commissioners to prepare in duplicate, and file with each Government, a joint report under their hands and seals describing the line so marked by them and the monuments and range marks and buoys marking it.

The line so defined and laid down shall be taken and deemed to be the international boundary from the mouth to the source of the St. Croix River as established by treaty provisions and the proceedings thereunder as aforesaid.

## ARTICLE III

## THE BOUNDARY FROM THE SOURCE OF THE ST. CROIX RIVER TO THE ST. LAWRENCE RIVER

Whereas the remonumenting of the course of the boundary defined and laid down under the provisions of Articles I and VI of the Treaty of August 9, 1842, between the United States and Great Britain has already been undertaken without a formal treaty agreement, but by the joint and concurrent action of the Governments of the United States and Great Britain, certain monuments between Vermont and Canada having been relocated in 1849, and the portion of said boundary extending between Hall's Stream and the St. Lawrence River in part having been remonumented in recent years and in part is now being remonumented under such action on both sides; and whereas the Commissioners appointed under Article VI of the Treaty of 1842 aforesaid were required to and did mark by monuments the land portion only of said line, and were not required to and did not mark by monuments the portions of the boundary extending along water courses, with the exception that the nationality of the several islands in the St. John River was indicated by monuments erected thereon and a series of monuments was placed by them along the edge of certain of the water courses to fix the general direction of the boundary, most of which monuments have since disappeared, but the entire boundary, including its course through the waterways as well as on land, was charted and marked on maps by said Commissioners under the provisions of Article VI above referred to, and the nationality of the respective islands in the St. John River was determined by them, as appears from the joint report filed by said Commissioners dated June 28, 1847, and the series of maps signed by said Commissioners and filed with their joint report; and whereas the portion of the line through said waterways has not since been monumented or marked along its course by joint action of the two Governments, and the monuments placed by said Commissioners along the land portion of said boundary require repairing and renewing where such work has not already been done in recent years, and additional or supplementary intermediate monuments at convenient points are required under modern conditions: therefore, in order to carry on and complete the work already undertaken as aforesaid, and to reestablish the location of said boundary and render thoroughly effective the demarcation of the said boundary as existent and established,

It is agreed that each of the High Contracting Parties shall appoint, without delay, an expert geographer or surveyor as a Commissioner, and under the joint direction of such Commissioners the lost or damaged boundary monuments shall be relocated and repaired, and additional monuments and boundary marks shall be established wherever necessary in the judgment of the Commissioners to meet the requirements of modern conditions along the course of the land portion of said boundary, and where the said boundary runs through waterways it shall be marked along its course, so far as practicable, by buoys and monuments in the water and by permanent ranges established on the land, and in such other way and at such points as in the judgment of the Commissioners it is desirable that the boundary be so marked; and it is further agreed that the course of the entire boundary, as described in Article I of the Treaty of 1842 and as laid down as aforesaid under Article VI of that Treaty, shall be marked by said Commissioners upon quadruplicate sets of accurate modern charts prepared or adopted by them for that purpose, and that said charts so marked shall be certified and signed by them and two duplicate originals thereof shall be filed with each Government, and said Commissioners shall also prepare in duplicate and file with each Government a joint report or reports describing in detail the course of the boundary so marked by them, and the character and location of the several monuments and boundary marks and ranges marking it.

The line so defined and laid down shall be taken and deemed to be the international boundary as defined and laid down under Articles I and VI of the said Treaty of 1842.

## ARTICLE IV

## THE BOUNDARY FROM ITS INTERSECTION WITH THE ST. LAWRENCE RIVER TO THE MOUTH OF PIGEON RIVER

The High Contracting Parties agree that the existing International Waterways Commission, constituted by concurrent action of the United States and the Dominion of Canada and composed of three Commissioners on the part of the United States and three Commissioners on the part of the Dominion of Canada, is hereby authorized and empowered to ascertain and reestablish accurately the location of the international boundary line beginning at the point of its intersection with the St. Lawrence River near the forty-fifth parallel of north latitude, as determined under Articles I and VI of the Treaty of August 9, 1842, between the United States and Great Britain, and thence through the Great Lakes and communicating waterways to the mouth of Pigeon River, at the western shore of Lake Superior, in accordance with the description of such line in Article II of the Treaty of Peace between the United States and Great Britain, dated September 3, 1783, and of a portion of such line in Article II of the Treaty of August 9, 1842, aforesaid, and as described in the joint report dated June 18, 1822, of the Commissioners appointed under Article VI of the Treaty of December 24, 1814, between the United States and Great Britain, with respect to a portion of said line and as marked on charts prepared by them and filed with said report, and with respect to the remaining portion of said line as marked on the charts adopted as treaty charts of the boundary under the provisions of Article II of the Treaty of 1842, above mentioned, with such deviation from said line, however, as may be required on account of the cession by Great Britain to the United States of the portion of Horse Shoe Reef in the Niagara River necessary for the light-house erected there by the United States in accordance with the terms of the protocol of a conference held at the British Foreign Office December 9, 1850, between the representatives of the two Governments and signed by them agreeing upon such cession; and it is agreed that wherever the boundary is shown on said charts by a curved line along the water the Commissioners are authorized in their discretion to adopt, in place of such curved line, a series of connecting straight lines defined by distances and courses and following generally the course of such curved line, but conforming strictly to the description of the boundary in the existing treaty provisions, and the geographical coordinates of the turning points of such line shall be stated by said Commissioners so as to conform to the system of latitudes and longitudes of the charts mentioned below, and the said Commissioners shall so far as practicable mark the course of the entire boundary line located and defined as aforesaid, by buoys and monuments in the waterways and by permanent range marks established on the adjacent shores or islands, and by such other boundary marks and at such points as in the judgment of the Commissioners it is desirable that the boundary should be so marked; and the line of the boundary defined and located as aforesaid shall be laid down by said Commissioners on accurate modern charts prepared or adopted by them for that purpose, in quadruplicate sets, certified and signed by the Commissioners, two duplicate originals of which shall be filed by them with each Government; and the Commissioners shall also prepare in duplicate and file with each Government a joint report or reports describing in detail the course of said line and the range marks and buoys marking it, and the character and location of each boundary mark. The majority of the Commissioners shall have power to render a decision.

The line so defined and laid down shall be taken and deemed to be the international boundary as defined and established by treaty provisions and the proceedings thereunder as aforesaid from its intersection with the St. Lawrence River to the mouth of Pigeon River.

## ARTICLE V

## THE BOUNDARY FROM THE MOUTH OF PIGEON RIVER TO THE NORTHWESTERNMOST POINT OF THE LAKE OF THE WOODS

In order to complete and perfect the demarcation of the international boundary line between the United States and the Dominion of Canada from the mouth of Pigeon River, at the western shore of Lake Superior, to the northwesternmost point of the Lake of the Woods, which boundary is defined in Article II of the Treaty of Peace between the United States and Great Britain dated September 3, 1783, and in Article II of the Treaty of August 9, 1842, between the United States and Great Britain, wherein is defined also the location of the said northwesternmost point of the Lake of the Woods, and the greater part of the said boundary is marked on charts covering that section of the boundary adopted as treaty charts of the boundary under the provisions of Article II of the Treaty of 1842 aforesaid, but has never been actually located or monumented along its course by joint action of the two Governments, and no joint survey of its course has been made since the survey under the direction of the Commissioners appointed under Article VII of the Treaty of December 24, 1814, between the United States and Great Britain, under whose direction the charts above mentioned were prepared,

It is agreed that each of the High Contracting Parties shall appoint, without delay, an expert geographer or surveyor as Commissioners, who shall reestablish and fix the actual location of said entire boundary described and charted as aforesaid, and designate the side of the boundary upon which each island adjacent to the boundary belongs, it being mutually understood that the boundary, so far as practicable, shall be a water line and shall not intersect islands lying along its course, and the Commissioners shall so far as practicable mark such boundary along its course by monuments and buoys and range marks, and such other boundary marks as the Commissioners may determine, and at such points as in their judgment it is desirable that the boundary shall be so marked; and it is further agreed that the course of the entire boundary as described and laid down as aforesaid and as monumented by said Commissioners shall be marked by them upon quadruplicate sets of accurate modern charts prepared or adopted by them for that purpose, and that said charts so marked shall be certified and signed by them and two duplicate originals thereof shall be filed with each Government, and said Commissioners shall also prepare in duplicate and file with each Government a joint report or reports describing in detail the course of the boundary so marked by them and the character and location of the several monuments and boundary marks and ranges marking it.

The line so defined and laid down shall be taken and deemed to be the international boundary as defined and established under the aforesaid treaties from the mouth of Pigeon River to the northwesternmost point of the Lake of the Woods.

## ARTICLE VI

## THE BOUNDARY FROM THE NORTHWESTERNMOST POINT OF THE LAKE OF THE WOODS TO THE SUMMIT OF THE ROCKY MOUNTAINS

*In order to complete and render thoroughly effective the demarcation of the international boundary between the United States and the Dominion of Canada from the northwesternmost point of the Lake of the Woods to the summit of the Rocky Mountains, which boundary, according to existing treaties, runs due south from said northwesternmost point to the forty-ninth parallel of north latitude and thence along that parallel to the summit of the Rocky Mountains, and has been surveyed and charted and monumented as appears from the series of twenty-four sectional maps covering this portion of the boundary prepared and filed by the Joint Commission appointed for that purpose by joint action of the two Governments in 1872,*

*It is agreed that each of the High Contracting Parties shall appoint, without delay, an expert geographer or surveyor as a Commissioner, and under the joint direction of such Commissioners lost or damaged monuments along the course of said boundary shall be relocated and repaired and addi-*



tional monuments and boundary marks shall be established wherever necessary, in the judgment of the Commissioners, to meet the requirements of modern conditions and to render more effective the demarcation of the existent boundary established under the treaty provisions and proceedings thereunder as aforesaid; and it is further agreed that in carrying out these provisions the said Commissioners shall observe the agreement stated in the protocol of the final meeting, dated May 29, 1876, of the Joint Commission aforesaid, which is as follows:

"2. In the intervals between the monuments along the parallel of latitude, it is agreed that the line has the curvature of a parallel of 49° north latitude; and that such characteristic shall determine all questions that may hereafter arise with reference to the position of the boundary at any point between neighboring monuments.

"3. It is further agreed that, in the event of any of the said three hundred and eighty-eight monuments or marks being obliterated beyond the power of recognition, the lost site or sites shall be recovered by their recorded position relatively to the next neighboring unobliterated mark or marks."

It is further agreed that the said Commissioners shall mark upon quadruplicate sets of accurate modern charts prepared or adopted by them for that purpose the entire course of said boundary and the location of the boundary monuments and marks established along the course of said boundary, and two duplicate originals thereof shall be filed with each Government, and said Commissioners shall also prepare in duplicate and file with each Government a joint report describing in detail the work done by them in replacing and repairing lost or damaged monuments and the character and location of the several monuments and boundary marks placed by them along said boundary.

The line so laid down and defined shall be taken and deemed to be the international boundary as defined and established by treaty provisions and the proceedings thereunder as aforesaid from the northwesternmost point of the Lake of the Woods to the summit of the Rocky Mountains.

## ARTICLE VII

### THE BOUNDARY FROM THE SUMMIT OF THE ROCKY MOUNTAINS TO THE GULF OF GEORGIA

Whereas, by concurrent action of the Government of the United States and the Government of Great Britain in 1902 and 1903, Commissioners were designated to act jointly for the purpose of renewing lost or damaged monuments and placing additional monuments where such were needed throughout the course of the boundary along the forty-ninth parallel of north latitude, from the summit of the Rocky Mountains westward to the eastern shore of the Gulf of Georgia, as defined in Article I of the Treaty of June 15, 1846, between the United States and Great Britain and as marked by monuments along its course and laid down on a series of charts, seven in number, by a Joint Commission organized in 1858 for that purpose and composed of two Commissioners appointed one by each Government, which charts, duly certified and authenticated in duplicate by said Commissioners, were approved and adopted by the two Governments, as appears from the declaration in writing to that effect signed on February 24, 1870, at Washington by duly authorized Plenipotentiaries of the respective Governments, and it appearing that the remonumenting of this line by the Commissioners first above referred to is now approaching completion;

It is hereby agreed by the High Contracting Parties that when such work is completed the entire course of said boundary, showing the location of the boundary monuments and marks established along the course of the boundary, shall be marked upon quadruplicate sets of accurate modern charts prepared or adopted for that purpose, and the said Commissioners, or their successors, are hereby authorized and required to so mark the line and designate the monuments on such charts, two duplicate originals of which shall be filed with each Government, and the said Commissioners, or their successors, shall also prepare in duplicate and file with each Government a joint report describing in detail the work done by them in replacing and repairing lost or damaged monuments and the character and location of the several monuments and boundary marks placed by them along said boundary.

The line so laid down and defined shall be taken and deemed to be the international boundary as defined and established by treaty provisions and the proceedings thereunder as aforesaid, from the summit of the Rocky Mountains to the eastern shore of the Gulf of Georgia.

## ARTICLE VIII

## THE BOUNDARY FROM THE FORTY-NINTH PARALLEL TO THE PACIFIC OCEAN

The High Contracting Parties agree that each shall appoint, without delay, an expert geographer or surveyor to serve as Commissioners for the purpose of delineating upon accurate modern charts, prepared or adopted by them for that purpose, the international boundary line between the United States and the Dominion of Canada from the forty-ninth parallel of north latitude along the middle of the channel which separates Vancouver's Island from the mainland and the middle of the Haro Channel and of Fuca's Straits to the Pacific Ocean, as defined in Article I of the Treaty of June 15, 1846, between the United States and Great Britain, and as determined by the award made on October 21, 1872, by the Emperor of Germany as arbitrator pursuant to the provisions of Articles XXXIV-XLII of the Treaty of May 8, 1871, between the United States and Great Britain, and as traced out and marked on a quadruplicate set of charts prepared for that purpose and agreed upon and signed by the duly authorized representatives of the respective Governments, as appears from the protocol of a conference at Washington on March 10, 1873, between such representatives which was signed by them on that date, and as defined by them in a written definition of said boundary signed by them and referred to in and attached to said protocol, and it is agreed that the said Commissioners shall adopt in place of the curved line passing between Saturna Island and Patos Island as shown on said charts a straight line running approximately north and south through a point midway between the eastern point of Saturna Island and the western point of Patos Island and intersecting the prolongations of the two straight lines of the boundary now joined by a curved line. The entire line thus laid down shall consist of a series of connecting straight lines defined by distances and courses; and the Commissioners are authorized to select and establish such reference marks on shore as they may deem necessary for the proper definition and location on the water of the boundary aforesaid. A quadruplicate set of such charts, showing the lines so laid down and marked by them and the location of the several marks or monuments selected or established by them along its course, shall be signed by them and two duplicate originals thereof shall be filed by them with each Government, and the Commissioners shall also prepare in duplicate and file with each Government a joint report, or reports, describing in detail the course of said line and the boundary marks and their location along its course.

The line so defined and laid down shall be taken and deemed to be the international boundary, as defined and established by treaty provisions and the proceedings thereunder as aforesaid, from the forty-ninth parallel of north latitude along the middle of the channel which separates Vancouver's Island from the mainland and the middle of Haro Channel and of Fuca's Straits to the Pacific Ocean.

## ARTICLE IX

## GENERAL PROVISIONS

The Commissioners appointed under the provisions of this Treaty shall proceed without delay to perform the duties assigned to them, but each Commissioner shall, before entering upon his duties, make oath in writing that he will impartially and faithfully perform his duties as such Commissioner.

In case a vacancy occurs in any of the Commissions constituted by this Treaty, by reason of the death, resignation, or other disability of a Commissioner, before the work of such Commission is completed, the vacancy so caused shall be filled forthwith by the appointment of another Commissioner by the party on whose side the vacancy occurs, and the Commissioner so appointed shall have the same powers and be subject to the same duties and obligations as the Commissioner originally appointed.

If a dispute or difference should arise about the location or demarcation of any portion of the boundary covered by the provisions of this Treaty and an agreement with respect thereto

is not reached by the Commissioners charged herein with locating and marking such portion of the line, they shall make a report in writing jointly to both Governments, or severally each to his own Government, setting out fully the questions in dispute and the differences between them, but such Commissioners shall, nevertheless, proceed to carry on and complete as far as possible the work herein assigned to them with respect to the remaining portions of the line.

In case of such a disagreement between the Commissioners, the two Governments shall endeavor to agree upon an adjustment of the questions in dispute, and if an agreement is reached between the two Governments it shall be reduced to writing in the form of a protocol, and shall be communicated to the said Commissioners, who shall proceed to lay down and mark the boundary in accordance therewith, and as herein provided, but without prejudice to the special provisions contained in Articles I and II regarding arbitration.

It is understood that under the foregoing articles the same persons will be appointed to carry out the delimitation of boundaries in the several sections aforesaid, other than the section covered by Article IV, unless either of the Contracting Powers finds it expedient for some reason which it may think sufficient to appoint some other person to be Commissioner for any one of the above-mentioned sections.

Each Government shall pay the expenses of its own Commissioners and their assistants, and the cost of marking and monumenting the boundary shall be paid in equal moieties by the two Governments.

#### ARTICLE X

This Treaty shall be ratified by the President of the United States, by and with the advice and consent of the Senate thereof, and by His Britannic Majesty; and the ratifications shall be exchanged in Washington as soon as practicable.

In faith whereof the respective Plenipotentiaries have signed this Treaty in duplicate and have hereunto affixed their seals.

Done at Washington the 11th day of April in the year of our Lord one thousand nine hundred and eight.

ELIHU ROOT    [SEAL.]  
JAMES BRYCE    [SEAL.]

TREATY BETWEEN THE UNITED STATES OF AMERICA AND HIS  
BRITANNIC MAJESTY, IN RESPECT OF THE DOMINION OF  
CANADA, TO DEFINE MORE ACCURATELY AT CERTAIN POINTS  
AND TO COMPLETE THE INTERNATIONAL BOUNDARY BETWEEN  
THE UNITED STATES AND CANADA AND TO MAINTAIN THE  
DEMARCATIION OF THAT BOUNDARY

*Signed at Washington, February 24, 1925*

*(Ratifications exchanged at Washington, July 17, 1925)*

The United States of America and His Majesty the King of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, Emperor of India, in respect of the Dominion of Canada, desiring to define more accurately at certain points and to complete the International Boundary between the United States and Canada and to maintain the demarcation of that boundary, have resolved to conclude a treaty for these purposes, and to that end have appointed as their respective Plenipotentiaries:

The President of the United States of America: Charles Evans Hughes, Secretary of State of the United States; and

His Britannic Majesty, in respect of the Dominion of Canada: The Honorable Ernest Lapointe, K. C., a member of His Majesty's Privy Council for Canada and Minister of Justice in the Government of that Dominion;

Who, after having communicated to each other their respective full powers, which were found to be in due and proper form, have agreed to and concluded the following articles:

ARTICLE I

*Whereas Article V of the Treaty concerning the boundary between the United States and the Dominion of Canada concluded on April 11, 1908, between the United States and Great Britain, provided for the survey and demarcation of the International Boundary Line between the United States and the Dominion of Canada from the mouth of Pigeon River, at the western shore of Lake Superior, to the Northwesternmost Point of Lake of the Woods, as defined by the Treaties concluded between the United States and Great Britain on September 3, 1783, and August 9, 1842;*

*And whereas Article VI of the said Treaty concluded on April 11, 1908, provided for the relocation and repair of lost or damaged monuments and for the establishment of additional monuments and boundary marks along the course of the International Boundary between the United States and the Dominion of Canada from the Northwesternmost Point of Lake of the Woods to the summit of the Rocky Mountains, as established under existing treaties and surveyed, charted, and monumented by the Joint Commission appointed for that purpose by joint action of the Contracting Parties in 1872;*

*And whereas it has been found by surveys executed under the direction of the Commissioners appointed pursuant to the said Treaty of April 11, 1908, that the boundary line between the United States and the Dominion of Canada from the mouth of Pigeon River, at the western shore of Lake Superior, to the Northwesternmost Point of Lake of the Woods as defined by the Treaties concluded on September 3, 1783, and August 9, 1842, is intersected by the boundary from the Northwesternmost Point of Lake of the Woods to the summit of the Rocky Mountains as established under existing treaties and surveyed, charted, and monumented by the Joint Commission appointed for that purpose in 1872, at five points in Lake of the Woods adjacent to and directly south of the said Northwesternmost*

*Point, and that there are two small areas of United States waters in Lake of the Woods, comprising a total area of two and one-half acres, entirely surrounded by Canadian waters;*

*And whereas no permanent monuments were ever erected on these boundary lines north of the most southerly of these points of intersection;*

*The Contracting Parties, in order to provide for a more practical definition of the boundary between the United States and the Dominion of Canada in Lake of the Woods, hereby agree that this most southerly point of intersection, being in latitude 49°23'04''.49 north, and longitude 95°09'11''.61 west,<sup>1</sup> shall be the terminus of the boundary line heretofore referred to as the International Boundary Line between the United States and the Dominion of Canada from the mouth of Pigeon River, at the western shore of Lake Superior, to the Northwesternmost Point of Lake of the Woods and the initial point of the boundary line heretofore referred to as the International Boundary between the United States and the Dominion of Canada from the Northwesternmost Point of Lake of the Woods to the summit of the Rocky Mountains, in lieu of the said Northwesternmost Point.*

*The aforesaid most southerly point shall be located and monumented by the Commissioners appointed under the said Treaty of April 11, 1908, and shall be marked by them on the chart or charts prepared in accordance with the provisions of Articles V and VI of the said Treaty, and a detailed account of the work done by the Commissioners in locating said point, together with a description of the character and location of the several monuments erected, shall be included in the report or reports prepared pursuant to the said Articles.*

*The point so defined and monumented shall be taken and deemed to be the terminus of the boundary line heretofore referred to as the International Boundary Line between the United States and the Dominion of Canada, from the mouth of Pigeon River, at the western shore of Lake Superior, to the Northwesternmost Point of Lake of the Woods and the initial point of the boundary line heretofore referred to as the International Boundary between the United States and the Dominion of Canada from the Northwesternmost Point of Lake of the Woods to the summit of the Rocky Mountains.*

## ARTICLE II

*Whereas Article VI of the Treaty concerning the boundary between the United States and the Dominion of Canada concluded on April 11, 1908, between the United States and Great Britain, provided for the relocation and repair of lost or damaged monuments and for the establishment of additional monuments and boundary marks along the courses of the International Boundary between the United States and the Dominion of Canada from the Northwesternmost Point of Lake of the Woods south to the 49th parallel of north latitude and thence westward along said parallel of latitude to the summit of the Rocky Mountains, as established under existing treaties and surveyed, charted, and monumented by the Joint Commission appointed for that purpose by joint action of the Contracting Parties in 1872;*

*And whereas Article VI of the said Treaty concluded on April 11, 1908, further provides that in carrying out the provisions of that Article the agreement stated in the protocol of the final meeting of the said Joint Commission, dated May 29, 1876, should be observed, by which protocol it was agreed that in the intervals between the monuments along the 49th parallel of north latitude the boundary line has the curvature of a parallel of 49° north latitude;*

*And whereas the Commissioners appointed and acting under the provisions of Article VI of the said Treaty of 1908 have marked the boundary line wherever necessary in the intervals between the original monuments established by the said Joint Commission, appointed in 1872, in accordance with the agreement stated in the protocol of the final meeting, dated May 29, 1876, of the Joint Com-*

<sup>1</sup> The geographic coordinates, latitude 49°23'04''.49, longitude 95°09'11''.61, used by the two Governments in defining the location of this point in the treaty of 1925, were obtained from an adjustment made in 1919 of triangulation executed by the International Boundary Commission, and are derived from the geographic positions of triangulation stations "States" and "Canada" as published in Appendix IV of the U. S. Coast and Geodetic Survey Report for 1911. The geographic position of this same point in terms of the North American datum of 1927, the datum on which all geographic positions of this section of the boundary line are based, is latitude 49°23'04''.14, longitude 95°09'11''.34.

*mission aforesaid, and as set forth in Article VI of the Treaty of 1908, by placing intermediate monuments on lines joining the original monuments, which have in each case the curvature of a parallel of 49° north latitude;*

*And whereas the average distance between adjacent monuments as thus established or reestablished along the 49th parallel of north latitude from Lake of the Woods to the summit of the Rocky Mountains by the Commissioners acting under Article VI of the Treaty of 1908 is one and one-third miles and therefore the deviation of the curve of the 49th parallel from a straight or right line joining adjacent monuments is, for this average distance between monuments, only one-third of a foot, and in no case does the actual deviation exceed one and eight-tenths feet;*

*And whereas it is impracticable to determine the course of a line having the curvature of a parallel of 49° north latitude on the ground between the adjacent monuments which have been established or reestablished by the Commissioners and the demarcation of the boundary would be more thoroughly effective if the line between adjacent monuments be defined as a straight or right line;*

*And whereas it is desirable that the boundary at any point between adjacent monuments may be conveniently ascertainable on the ground, the Contracting Parties, in order to complete and render thoroughly effective the demarcation of the boundary between the United States and the Dominion of Canada from the Northwesternmost Point of Lake of the Woods to the summit of the Rocky Mountains, hereby agree that the line heretofore referred to as the International Boundary between the United States and the Dominion of Canada from the Northwesternmost Point of Lake of the Woods to the summit of the Rocky Mountains shall be defined as consisting of a series of right or straight lines joining adjacent monuments as now established or reestablished and as now laid down on charts by the Commissioners acting under Article VI of the Treaty of 1908, in lieu of the definition set forth in the agreement of the aforesaid Joint Commissioners, dated May 29, 1876, and quoted in Article VI of the said Treaty of 1908, that in the intervals between the monuments the line has the curvature of the parallel of 49° north latitude.*

### ARTICLE III

Whereas the Treaty concluded on May 21, 1910, between the United States and Great Britain, defined the International Boundary Line between the United States and the Dominion of Canada, from a point in Passamaquoddy Bay lying between Treat Island and Friar Head to the middle of Grand Manan Channel and provided that the location of the line so defined should be laid down and marked by the Commissioners appointed under the Treaty of April 11, 1908;

And whereas it has been found by the surveys executed pursuant to the said Treaty of May 21, 1910, that the terminus of the boundary line defined by said Treaty at the middle of Grand Manan Channel is less than three nautical miles distant both from the shore line of Grand Manan Island in the Dominion of Canada and from the shore line of the State of Maine in the United States, and that there is a small zone of waters of controvertible jurisdiction in Grand Manan Channel between said terminus and the High Seas;

The Contracting Parties, in order completely to define the boundary line between the United States and the Dominion of Canada in the Grand Manan Channel, hereby agree that an additional course shall be extended from the terminus of the boundary line defined by the said Treaty of May 21, 1910, south 34°42' west, for a distance of two thousand three hundred eighty-three (2,383) meters, through the middle of Grand Manan Channel, to the High Seas.

The course so defined shall be located and marked by the Commissioners appointed under the Treaty of April 11, 1908, and shall be laid down by them on the chart or charts adopted in accordance with the provisions of Article I of the said Treaty, and a detailed account of the work done by the Commissioners in locating and marking said line, together with a description of the several monuments erected, shall be included in the report or reports prepared pursuant to Article I of the Treaty of April 11, 1908.

The course so defined and laid down shall be taken and deemed to be the boundary line between the United States and the Dominion of Canada in Grand Manan Channel from the terminus of the boundary line as defined by the Treaty of May 21, 1910, to the High Seas.

## ARTICLE IV .

Whereas, pursuant to existing treaties between the United States and Great Britain, a survey and effective demarcation of the boundary line between the United States and the Dominion of Canada through the Great Lakes and the St. Lawrence River and through the Straits of Georgia, Haro, and Juan de Fuca from the 49th Parallel to the Pacific Ocean and between Alaska and the Dominion of Canada from the Arctic Ocean to Mount St. Elias have been made and the signed joint maps and reports in respect thereto have been filed with the two Governments;

And whereas a survey and effective demarcation of the boundary line between the United States and the Dominion of Canada from the Gulf of Georgia to Lake Superior and from the St. Lawrence River to the Atlantic Ocean and between Alaska and the Dominion of Canada from Mount St. Elias to Cape Muzon are nearing completion;

And whereas boundary monuments deteriorate and at times are destroyed or damaged; and boundary vistas become closed by the growth of timber;

And whereas changing conditions require from time to time that the boundary be marked more precisely and plainly by the establishment of additional monuments or the relocation of existing monuments;

The Contracting Parties, in order to provide for the maintenance of an effective boundary line between the United States and the Dominion of Canada and between Alaska and the Dominion of Canada, as established or to be established, and for the determination of the location of any point thereof, which may become necessary in the settlement of any question that may arise between the two Governments hereby agree that the Commissioners appointed under the provisions of the Treaty of April 11, 1908, are hereby jointly empowered and directed: to inspect the various sections of the boundary line between the United States and the Dominion of Canada and between Alaska and the Dominion of Canada at such times as they shall deem necessary; to repair all damaged monuments and buoys; to relocate and rebuild monuments which have been destroyed; to keep the boundary vistas open; to move boundary monuments to new sites and establish such additional monuments and buoys as they shall deem desirable; to maintain at all times an effective boundary line between the United States and the Dominion of Canada and between Alaska and the Dominion of Canada, as defined by the present Treaty and Treaties heretofore concluded, or hereafter to be concluded; and to determine the location of any point of the boundary line which may become necessary in the settlement of any question that may arise between the two Governments.

The said Commissioners shall submit to their respective Governments from time to time, at least once in every calendar year, a joint report containing a statement of the inspections made, the monuments and buoys repaired, relocated, rebuilt, moved, and established, and the mileage and location of vistas opened, and shall submit with their reports, plats and tables certified and signed by the Commissioners, giving the locations and geodetic positions of all monuments moved and all additional monuments established within the year, and such other information as may be necessary to keep the boundary maps and records accurately revised.

After the completion of the survey and demarcation of the boundary line between the United States and the Dominion of Canada from the Gulf of Georgia to Lake Superior and from the St. Lawrence River to the Atlantic Ocean, as provided for by the Treaty of April 11, 1908, the Commissioners appointed under the provisions of that Treaty shall continue to carry out the provisions of this Article, and, upon the death, resignation, or other disability of either of them, the Party on whose side the vacancy occurs shall appoint an Expert Geographer or Surveyor as Commissioner, who shall have the same powers and duties in respect to carrying out the provisions of this Article, as are conferred by this Article upon the Commissioner appointed under the provisions of the said Treaty of 1908.

The Contracting Parties further agree that each Government shall pay the salaries and expenses of its own Commissioner and his assistants, and that the expenses jointly incurred

by the Commissioners in maintaining the demarcation of the boundary line in accordance with the provisions of this Article shall be borne equally by the two Governments.

#### ARTICLE V

This Treaty shall be ratified by the Contracting Parties and the ratifications shall be exchanged in Washington or Ottawa as soon as practicable. The Treaty shall take effect on the date of the exchange of ratifications.

Upon the expiration of six years from the date of the exchange of ratifications of the present Treaty, or any time thereafter, Article IV may be terminated upon twelve months' written notice given by either Contracting Party to the other, and following such termination the Commissioners therein mentioned and their successors shall cease to perform the functions thereby prescribed.

In faith whereof, the respective Plenipotentiaries have signed this Treaty in duplicate and have hereunto affixed their seals.

Done at Washington the 24th day of February, A. D. 1925.

[SEAL]

[SEAL]

CHARLES EVANS HUGHES.

ERNEST LAPOINTE.



APPOINTMENTS OF THE COMMISSIONERS UNDER CONCURRENT  
ACTION OF 1902-1903 AND UNDER THE TREATY OF 1908

DR. W. F. KING FOR HIS BRITANNIC MAJESTY

P. C. 1098-L

CERTIFIED COPY OF A REPORT OF A COMMITTEE OF THE HONOURABLE THE PRIVY COUNCIL,  
APPROVED BY HIS EXCELLENCY ON THE 4TH JUNE, 1902

The Committee of the Privy Council have had under consideration a despatch dated 7th April, 1902, from His Majesty's Ambassador to the United States transmitting copy of a note from the Secretary of State of the United States, relative to the demarcation of the boundary between the Dominion of Canada and the United States from Lake Superior to the Pacific Ocean.

The Minister of the Interior, to whom the said despatch was referred, observes that the opinion stated by the Secretary of State of the United States, as based on the reports of their officers charged last year with the duty of examining into the condition of the original monuments along the 49th parallel West of the Rocky Mountains, that these monuments are still in such a satisfactory condition that their locations are readily recoverable, is fully in accord with the results of the examinations and surveys made last year by Messrs. McArthur and O'Hara, surveyors employed by the Minister of the Interior to make a concurrent examination with the United States Officers aforesaid.

The Secretary of State, further, is of opinion that this condition of the frontier marks renders it unnecessary to resort to a new convention for the establishment of that part of the boundary, and that all that remains to be done in order to render the marking thoroughly effective for the requirements of the present time and of the future is merely the replacement of the old monuments by more permanent ones, and the interpolation of intermediate monuments at convenient points along the existing established boundary. He accordingly suggests the appointment by His Majesty's Government of one or more officers to carry out the necessary restoration of old and establishment of new monuments in concert with the officers designated by the United States Government for that purpose; namely, the Superintendent of the United States Coast and Geodetic Survey and the Director of the United States Geological Survey.

The Minister further observes with reference to this, that the proposed renovation and completion of the work of the Boundary Commission of 1856-1869, is fully in line with, though in advance of the suggestion made by His Excellency's advisers in their Minute of 5th January, 1901, which particularly referred to the renewed marking at three specified localities merely, and is further very desirable in the best interests of both Countries.

The Minister, further, recommends that Mr. W. F. King, the Chief Astronomer of the Department of the Interior, who is conversant with the subject and has had the direction on the part of Canada of the surveys and examinations which were made last year and are being continued this year along the line, be nominated as a suitable person to represent His Majesty's Government in arranging the necessary details and carrying out the work in concert with the officers named by the United States Government.

The Committee advise that His Excellency be moved to communicate the substance of this Minute to the Right Honourable His Majesty's Secretary of State for the Colonies.

All which is respectfully submitted for His Excellency's approval.

JOHN J. MCGEE,  
*Clerk of the Privy Council.*

The Honourable

THE MINISTER OF THE INTERIOR.

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MESSRS. O. H. TITTMANN AND CHARLES D. WALCOTT FOR THE UNITED STATES

JOHN HAY, SECRETARY OF STATE FOR THE UNITED STATES

DEPARTMENT OF STATE,  
*Washington, June 9, 1903.*

Messrs. O. H. TITTMANN,  
*Superintendent, Coast and Geodetic Survey,*  
and  
CHARLES D. WALCOTT,  
*Director, Geological Survey.*

GENTLEMEN: You are hereby authorized to sign as United States Commissioners in all matters relating to the work of marking and mapping that portion of the 49th parallel between the summit of the Rocky Mountains and Point Roberts, as provided for in the Sundry Civil Appropriation Act, approved March 3, 1903, including the signature with the British Commissioner of the final report and maps.

I am, Gentlemen, Your obedient servant,

JOHN HAY.

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MR. O. H. TITTMANN FOR THE UNITED STATES

THEODORE ROOSEVELT, PRESIDENT OF THE UNITED STATES OF AMERICA

*To all to whom these Presents shall come, Greeting:*

Know Ye, that reposing special trust and confidence in the integrity and ability of Otto H. Tittmann, of Missouri, Superintendent of the United States Coast and Geodetic Survey, I do appoint him the expert Commissioner on the part of the United States for the purpose of more accurately defining and marking the International Boundary Line between the United States and the Dominion of Canada, under the provisions of Articles I, II, III, V, VI, VII, and VIII of the treaty between the United States and Great Britain, signed at Washington on April 11, 1908, and do authorize and empower him to execute and fulfill the duties of this commission with all the powers, privileges, and emoluments thereunto of right appertaining, during the pleasure of the President of the United States.

In testimony whereof, I have caused the Seal of the United States to be hereunto affixed.

Given under my hand at the City of Washington this fifth day of June, in the year of our Lord one thousand nine hundred and eight, and of the Independence of the United States of America the one hundred and thirty-second.

THEODORE ROOSEVELT.

[SEAL]

By the President:

ELIHU ROOT, *Secretary of State.*

## DR. W. F. KING FOR HIS BRITANNIC MAJESTY

P. C. 2181-M

CERTIFIED COPY OF A REPORT OF THE COMMITTEE OF THE PRIVY COUNCIL, APPROVED BY HIS  
EXCELLENCY THE GOVERNOR GENERAL ON THE 27TH JUNE, 1908

The Committee of the Privy Council have had under consideration a despatch, dated 10th June, 1908, from His Majesty's Ambassador to the United States, containing the information that the ratifications of the Treaty for the Delimitation of the International Boundary between the United States and Canada were exchanged on the 4th June, 1908.

The Minister of the Interior, to whom the despatch was referred, observes that the Treaty, for the purpose of the more complete definition and demarcation which it contemplates, divides the boundary line, from the Atlantic Ocean at the entrance to Passamaquoddy Bay, to the Pacific Ocean at the Strait of Fuca, into eight sections, and provides that for each section, with the exception of the fourth section, which includes the line through the St. Lawrence River and the Great Lakes, and which is to be dealt with by the existing International Waterways Commission, two expert geographers or surveyors shall be appointed, one by each Government, as Commissioners to accurately define and mark the line, with the understanding stated in Article 9, that the same persons shall be appointed Commissioners under the several sections, excepting the fourth section, unless either Government find it expedient for some reason which it may think sufficient, to appoint some other person to be Commissioner for any of the sections.

The Minister, in accordance with the provisions above mentioned, recommends that Mr. William Frederick King, Dominion Topographical Surveyor, and Chief Astronomer of the Department of the Interior, be nominated for the position of His Majesty's Commissioner for all the sections of the line except the fourth.

The Committee concurring advise that your Excellency may be pleased to inform his Majesty's Secretary of State for the Colonies of the desire of your Excellency's Government in this regard.

All which is respectfully submitted for approval.

RODOLPHE BOUDREAU,  
*Clerk of the Privy Council.*

The Honourable  
THE MINISTER OF THE INTERIOR.

## MR. E. C. BARNARD FOR THE UNITED STATES

WOODROW WILSON, PRESIDENT OF THE UNITED STATES OF AMERICA

*To all to whom these Presents shall come, Greeting:*

Know Ye, that reposing special trust and confidence in the Integrity and Ability of Edward C. Barnard, of New York, I do appoint him the expert Commissioner on the part of the United States for the purpose of more accurately defining and marking the International Boundary Line between the United States and the Dominion of Canada, under the provisions of Articles I, II, III, V, VI, VII, and VIII of the treaty between the United States and Great Britain, signed at Washington on April 11, 1908, and do authorize and empower him to execute and fulfill the duties of this commission with all the powers, privileges and emoluments thereunto of right appertaining, during the pleasure of the President of the United States.

In testimony whereof, I have caused the Seal of the United States to be hereunto affixed.

Given under my hand at the City of Washington this thirtieth day of April, in the year of our Lord one thousand nine hundred and fifteen, and of the Independence of the United States of America the one hundred and thirty-ninth.

[SEAL]

WOODROW WILSON.

By the President:

W. J. BRYAN, *Secretary of State.*

MR. J. J. McARTHUR FOR HIS BRITANNIC MAJESTY

[SEAL]

GEORGE R. I.

GEORGE by the Grace of God, of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, King, Defender of the Faith, Emperor of India, Etc., Etc.

*To all and singular to whom these Presents shall come, Greeting!*

Whereas by a Treaty concluded at Washington on the 11th day of April, 1908, between our Royal Predecessor His Majesty King Edward VII and our Good Friends the United States of America, respecting the Demarcation of the International Boundary between the United States and the Dominion of Canada, it was in effect provided that Commissioners should be appointed on Our part and on that of Our said Good Friends, and that the Commissioners so appointed should define and mark the boundary line, with the exception of that portion of it extending from the 45th parallel of north latitude through the St. Lawrence River, the Great Lakes and connecting waterways to the mouth of the Pigeon River;

Now Know Ye that We, reposing especial trust and confidence in the approved learning, wisdom and fidelity of Our Trusty and Well-beloved James Joseph McArthur, Esquire, Dominion Land Surveyor, have named and appointed, as We do by these Presents name and appoint him to be Our Commissioner for the purposes aforesaid and pursuant to the said Treaty, to meet the other Commissioner appointed or to be appointed in like manner by Our Good Friends the United States of America, to do and determine all such matters as are provided to be done by him under the said Treaty, in the manner therein provided.

In witness whereof We have signed these Presents with Our Royal Hand.

Given at Our Court of Saint James the Twenty-sixth day of February One thousand Nine Hundred and Seventeen in the Seventh year of Our Reign.

By His Majesty's Command:

ARTHUR JAMES BALFOUR.

MR. E. LESTER JONES FOR THE UNITED STATES

WOODROW WILSON, PRESIDENT OF THE UNITED STATES OF AMERICA

*To all to whom these Presents shall come, Greeting:*

Know Ye, that reposing special trust and confidence in the Integrity and Ability of E. Lester Jones, of Virginia, I do appoint him the expert Commissioner on the part of the United States for the purpose of more accurately defining and marking the International Boundary Line between the United States and the Dominion of Canada, under the provisions of Articles I, II, III, V, VI, VII, and VIII of the treaty between the United States and Great Britain, signed at Washington on April 11, 1908, and do authorize and empower him to execute and fulfill the duties of this commission with all the powers, privileges and emoluments thereunto of right appertaining, during the pleasure of the President of the United States.

In testimony whereof, I have caused the Seal of the United States to be hereunto affixed.

Given under my hand, in the District of Columbia, this twenty-eighth day of February, in the year of our Lord one thousand nine hundred and twenty-one, and of the Independence of the United States of America the one hundred and forty-fifth.

[SEAL]

WOODROW WILSON.

By the President:

BAINBRIDGE COLBY, *Secretary of State.*

## MR. J. D. CRAIG FOR HIS BRITANNIC MAJESTY

[SIGNET]

(Sgd.) GEORGE R. I.

GEORGE, by the Grace of God, of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas King, Defender of the Faith, Emperor of India, Etc., Etc., Etc.

*To all and singular to whom these Presents shall come, Greeting!*

Whereas by Article VI of a Convention concluded at Washington on the 24th day of January 1903 between Our Royal Predecessor His Majesty King Edward VII and Our Good Friends the United States of America, respecting the adjustment of the Boundary between the Dominion of Canada and the Territory of Alaska, it was in effect provided that Commissioners should be appointed on Our part and on that of Our said Good Friends, for the purpose of laying down the boundary line in conformity with the decision of the Tribunal constituted under the terms of Article I of the said Convention;

And whereas by a Treaty concluded at Washington on the 11th day of April 1908 between Our said Royal Predecessor and Our said Good Friends, respecting the Demarcation of the International Boundary between the United States and the Dominion of Canada, it was in effect provided that Commissioners should be appointed on Our part and on that of Our said Good Friends, to define and mark the boundary line, with the exception of that portion of it extending from the 45th parallel of north latitude through the Saint Lawrence River, the Great Lakes and connecting waterways to the mouth of the Pigeon River;

Now know ye that We, reposing especial Trust and Confidence in the approved Learning, Wisdom and Fidelity of Our Trusty and Well-beloved John Davidson Craig, Esquire, Bachelor of Arts, Bachelor of Science, Member of the Engineering Institute of Canada, Dominion Land Surveyor and International Boundary Commission Engineer, have named and appointed, as We do by these Presents name and appoint him to be Our Commissioner for the purposes aforesaid and pursuant to the said Convention and Treaty, to meet the other Commissioners appointed or to be appointed in like manner by Our Good Friends the United States of America, and to do and determine all such matters as are provided to be done by him under the said Convention and Treaty, in the manner therein provided.

In witness whereof We have signed these Presents with Our Royal Hand.

Given at Our Court of Saint James the Seventh day of March in the Year of Our Lord One thousand Nine hundred and Twenty-Five and in the Fifteenth Year of Our Reign.

## MR. JAMES H. VAN WAGENEN FOR THE UNITED STATES

HERBERT HOOVER, PRESIDENT OF THE UNITED STATES OF AMERICA

*To all to whom these Presents shall come, Greeting:*

Know Ye, That reposing special trust and confidence in the Integrity and Ability of James H. Van Wagenen, of Iowa, I do appoint him the expert Commissioner on the part of the United States for the purpose of more accurately defining and marking the International Boundary Line between the United States and the Dominion of Canada, under the provisions of Articles I, II, III, V, VI, VII and VIII of the treaty between the United States and Great Britain, signed at Washington on April 11, 1908, and Article IV of the treaty between the United States and Great Britain, signed at Washington on February 24, 1925, and do authorize and empower him to execute and fulfil the duties of this commission with all the powers, privileges and emoluments thereunto of right appertaining, during the pleasure of the President of the United States.

In testimony whereof, I have caused the Seal of the United States to be hereunto affixed.

Done at the City of Washington this third day of May, in the year of our Lord one thousand nine hundred and twenty-nine, and of the Independence of the United States of America the one hundred and fifty-third.

[SEAL]

HERBERT HOOVER.

By the President:

HENRY L. STIMSON, *Secretary of State*.

## MR. NOEL J. OGILVIE FOR HIS BRITANNIC MAJESTY

[SIGNET]

(Sgd.) GEORGE R. I.

GEORGE, by the Grace of God, of Great Britain, Ireland and the British Dominions beyond the Seas King, Defender of the Faith, Emperor of India, Etc., Etc., Etc.

*To all and singular to whom these Presents shall come, Greeting!*

Whereas by Article VI of a Convention concluded at Washington on the 24th day of January 1903 between Our Royal Predecessor His Majesty King Edward VII and Our Good Friends the United States of America, respecting the adjustment of the Boundary between the Dominion of Canada and the Territory of Alaska, it was in effect provided that Commissioners should be appointed on Our part and on that of Our said Good Friends, for the purpose of laying down the boundary line in conformity with the decision of the Tribunal constituted under the terms of Article I of the said Convention;

And whereas by a Treaty concluded at Washington on the 11th day of April 1908 between Our said Royal Predecessor and Our said Good Friends, respecting the Demarcation of the International Boundary between the United States and the Dominion of Canada, it was in effect provided that Commissioners should be appointed on Our part and on that of Our said Good Friends, to define and mark the boundary line, with the exception of that portion of it extending from the 45th parallel of north latitude through the Saint Lawrence River, the Great Lakes and connecting waterways to the mouth of the Pigeon River;

Now know ye that We, reposing especial Trust and Confidence in the approved Learning, Wisdom and Fidelity of Our Trusty and Well-beloved Noel John Ogilvie, Esquire, Dominion Land Surveyor, Member of the Engineering Institute of Canada, Member of the American Society of Civil Engineers, the Director of the Geodetic Survey of Canada, have named and appointed, as We do by these Presents name and appoint him to be Our Commissioner for the purposes aforesaid and pursuant to the said Convention and Treaty, to meet the other Commissioners appointed or to be appointed in like manner by Our Good Friends the United States of America, and to do and determine all such matters as are provided to be done by him under the said Convention and Treaty, in the manner therein provided, this appointment to be effective as and from the 14th day of May of this year.

In witness whereof We have signed these Presents with Our Royal Hand.

Given at Our Court of Saint James the tenth day of June in the Year of Our Lord One Thousand Nine Hundred and Thirty-one and in the Twenty-second Year of Our Reign.

## MR. THOMAS RIGGS FOR THE UNITED STATES

FRANKLIN D. ROOSEVELT, PRESIDENT OF THE UNITED STATES OF AMERICA

*To all to whom these Presents shall come, Greeting:*

Know Ye, That reposing special trust and confidence in the Integrity and Ability of Thomas Riggs, of New York, I do appoint him the expert Commissioner on the part of the United States for the purpose of more accurately defining and marking the International Boundary Line between the United States and the Dominion of Canada, under the provisions of Articles I, II, III, V, VI, VII, and VIII of the treaty between the United States and Great Britain, signed at Washington on April 11, 1908, and Article IV of the treaty between the United States and Great Britain, signed at Washington on February 24, 1925, and do authorize and empower him to execute and fulfil the duties of this commission with all the powers, privileges and emoluments thereunto of right appertaining, during the pleasure of the President of the United States.

In testimony whereof, I have caused the Seal of the United States to be hereunto affixed.

Done at the City of Washington this first day of August, in the year of our Lord one thousand nine hundred and thirty-five, and of the Independence of the United States of America the one hundred and sixtieth.

[SEAL]

FRANKLIN D. ROOSEVELT

By the President:

WILLIAM PHILLIPS, *Acting Secretary of State.*

## RESERVATION OF LANDS ALONG THE INTERNATIONAL BOUNDARY

### PROCLAMATIONS BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

(No. 810)

Whereas, the customs and immigration laws of the United States can be better enforced and the public welfare thereby better advanced when the Federal Government has complete control of the use and occupation of lands abutting on international boundary lines;

Now, therefore, I, Theodore Roosevelt, President of the United States, do hereby proclaim and make known that all unpatented public lands of the United States, lying within sixty feet of the boundary line between the United States and the Dominion of Canada, are hereby declared to be, and are set apart as a public reservation, and shall hereafter be subject only to such rights as have been heretofore legally acquired under settlements, entries, reservations, or other forms of appropriation, and are now existing, but shall not be subject at any time to any other claim, use, or occupation, except for public highways; and any patent issued for any legal subdivision affected by this reservation under any claim hereafter initiated, shall contain a recital that it is issued subject to this proclamation.

In witness whereof, I have hereunto set my hand and caused the seal of the United States to be affixed.

Done at the City of Washington this 15th day of June, in the year of our Lord one thousand nine hundred and eight, and of the Independence of the United States the one hundred and thirty-second.

[SEAL]

THEODORE ROOSEVELT

By the President:

ELIHU ROOT, *Secretary of State*.

(No. 1196)

Whereas, the customs and immigration laws of the United States can be better enforced and the public welfare thereby advanced by the retention in the Federal Government of complete control of the use and occupation of lands abutting on International Boundary Lines;

Now, therefore, I, William Howard Taft, President of the United States, do hereby declare, proclaim, and make known that there are hereby reserved from entry, settlement, or other form of appropriation and disposition under the public-land laws, and set apart as a public reservation, all public lands lying within sixty feet of the boundary line between the United States and the Dominion of Canada.

Excepting from the force and effect of this proclamation all lands which were prior to June fifteenth, nineteen hundred and eight, embraced in any legal entry or covered by any lawful filing, selection, or right of way duly of record in the proper United States land office or upon which any valid settlement had been made pursuant to law, the statutory period within which to make or complete entry or filing of record had not expired, and which has been or may be perfected as required by law. Any claims lawfully initiated between June fifteenth, nineteen hundred and eight, and the date hereof, lawfully maintained and perfected, may be patented subject to the reservation prescribed in proclamation of the President dated June fifteenth, nineteen hundred and eight.

In witness whereof, I have hereunto set my hand and caused the seal of the United States to be affixed.

Done at the city of Washington, this third day of May, in the year of our Lord one thousand nine hundred and twelve, and of the Independence of the United States the one hundred and thirty-sixth.

[SEAL]

WM. H. TAFT

By the President:

HUNTINGTON WILSON, *Acting Secretary of State.*

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#### ACTION TAKEN BY THE PROVINCIAL GOVERNMENTS OF THE DOMINION OF CANADA RESERVATIONS BY THE PROVINCE OF BRITISH COLUMBIA

His Honour the Lieutenant-Governor of British Columbia, by and with the advice of his Executive Council, doth order as follows:

That all unalienated Crown lands within the Province of British Columbia lying within sixty feet of the 49th parallel of north latitude which is the boundary line between the United States of America and the Dominion of Canada; and also all unalienated Crown lands lying within sixty feet of the boundary line between the Province of British Columbia and Alaska, be reserved for Government purposes.

A. CAMPBELL REDDIE,  
*Deputy Clerk,  
Executive Council.*

APPROVED AND ORDERED  
THIS 5TH DAY OF NOVEMBER,  
A. D. 1908.

JAMES DUNSMUIR,  
*Lieutenant-Governor.*

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#### RESERVATIONS BY THE PROVINCE OF ALBERTA

In Alberta, while no legislation has as yet been passed making reservations of land along the boundary, the system of public land surveys provides for a road allowance 66 feet in width along and adjoining the boundary.

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#### RESERVATIONS BY THE PROVINCE OF SASKATCHEWAN

The Provincial Lands Act of Saskatchewan of 1931, Section 6, provides as follows:

(1) There is hereby reserved to the Crown out of every disposition of Provincial lands extending to the boundary line between Canada and the United States of America a strip of land one chain in width measured from such boundary line, and no buildings or works shall be erected or executed on such land.

(2) Notwithstanding subsection (1) the Crown may permit the occupation of or otherwise dispose of any such reserved strip of land or any part thereof for the purposes of the construction of railways, waterways, wharves, bridges, canals, ditches, or other works of public character, upon such terms and conditions as the Lieutenant Governor in Council may in each case prescribe.

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#### RESERVATIONS BY THE PROVINCE OF MANITOBA

In 1930 the Provincial Legislature of Manitoba enacted "The Provincial Lands Act", being chapter 32 of the Statutes of that year, and in section 6, subsections (1) and (2) provided as follows:



6. (1) There is hereby reserved to the Crown out of every disposition of Provincial lands extending to the sea or any inlet thereof or to the boundary line between Canada and the United States of America or between the Province of Manitoba and the Provinces of Ontario or Saskatchewan, or the Northwest Territories, respectively, whether under this or any other Act of this Legislature, a strip of land one and one-half chains in width measured from high water mark or such boundary line, as the case may be, and no buildings or works shall be erected or executed on such land.

(2) Notwithstanding subsection (1) hereof the Crown may permit the occupation of or otherwise dispose of any such reserved strip of land or any part thereof for the purposes of the construction of railways, waterways, wharves, docks, shipyards, bridges, canals, ditches, or other works of a public character, upon such terms and conditions as the Lieutenant-Governor-in-Council may in each case prescribe.

This Act was repealed in 1934 by "The Crown Lands Act", being chapter 7 of the Statutes of that year, and in section 5 thereof it is provided as follows:

5. In the absence of express provision to the contrary therein, there is reserved to the Crown out of every disposition of Crown land,

(a) in case the land extends—

- (i) to the sea or an inlet thereof; or
- (ii) to the shores of any navigable water or an inlet thereof; or
- (iii) to the boundary line between Canada and the United States of America, or between the Province and the Provinces of Ontario or Saskatchewan, or the Northwest Territories;

a strip of land one and one-half chains in width, measured from ordinary high-water mark or from the boundary line, as the case is;

- (b) where the land borders a body of navigable water, the public right of landing from and mooring boats and vessels so far as is reasonably necessary;
- (c) where the land borders a body of water,
  - (i) the bed of the body of water below ordinary high-water mark; and
  - (ii) the public right of passage over a portage road or trail in existence at the date of the disposition;
- (d) mines and minerals, together with the right to enter, locate, prospect, mine for, and remove minerals;
- (e) the right to and to use land necessary for the protection or development of adjacent water power; and
- (f) the right to raise or lower the levels of a body of water adjacent to the land, regardless of the effect upon the land, but subject to the payment of compensation for permanent improvements on the land to the extent that the improvements are damaged thereby.

AGREEMENT OF THE COMMISSIONERS AS TO THE MANNER IN  
WHICH THE PROVISIONS OF THE CONCURRENT ACTION OF  
1902-1903, OF ARTICLES VI AND VII OF THE TREATY OF  
1908, AND OF ARTICLES I AND II OF THE TREATY OF 1925  
SHOULD BE CARRIED OUT

At a meeting of the Commissioners held in Washington on March 16, 1904, their appointments under the concurrent action of the two Governments were presented and found to be in due and proper form. At this and subsequent conferences, including the first meeting of the Commissioners under the treaty of 1908 held in Ottawa on December 28, 1908, it was agreed that the reestablishment of the boundary under the concurrent action of the two Governments in 1902-1903 and under the provisions of articles VI and VII of the treaty of 1908 and articles I and II of the treaty of 1925 should be carried out in the following manner:

I. That the retracement and mapping of the parts of the boundary line west of the summit of the Rocky Mountains, done in 1901<sup>1</sup> and 1902, in which both Governments participated prior to their concurrent action regarding this part of the boundary, should be accepted; and that the results should be incorporated in the final reports made by the Commissioners.

II. That, in accordance with the instructions received from their respective Governments, the boundary line along the 49th parallel between the United States and Canada from Point Roberts to the summit of the Rocky Mountains should be located in accordance with the conclusions of the Commission of 1857-1869, signed by the Commissioners in Washington May 7, 1869, namely: "It is agreed by the Commissioners that between any two successive defined points marked on the ground, shown on the maps, and set forth in the accompanying lists, the line of boundary above described is to be understood to be a right or straight line; and this rule is to apply throughout the entire boundary without regard to the distances between the consecutive monuments or to the course of the parallel in such intervals."

III. That, in order to expedite the work and to save expense, the United States parties and the Canadian parties should work independently; and, taking into consideration the difficulties and estimated cost of the work in different localities, in order to bring about an equal division of the expense, the following sections of the line west of the summit of the Rocky Mountains should be surveyed and monumented by Canadian parties:

From Point Roberts to the boundary crossing of the Skagit River...	91 miles
From the crossing of the Similkameen River to the crossing of the Kettle River at Midway, British Columbia.....	42 miles

<sup>1</sup> Parts of sheets 10, 17, and 18 of the 49th parallel boundary maps are marked "surveyed in 1901."

From the crossing of the Kettle River near Laurier, Washington  
(Cascade, British Columbia), to the crossing of the Kootenai<sup>2</sup>  
River at Porthill, Idaho..... 77 miles

Total..... 210 miles

and the following sections of the line west of the summit of the Rocky Mountains  
should be surveyed and monumented by United States parties:

From the crossing of the Skagit River to the crossing of the  
Similkameen River..... 63 miles

From the crossing of the Kettle River at Midway, British Columbia,  
to the crossing of the Kettle River near Laurier, Washington  
(Cascade, British Columbia)..... 26 miles

From the crossing of the Kootenai River at Porthill, Idaho, to the  
summit of the Rocky Mountains..... 111 miles

Total..... 200 miles

and that each Government should bear all the expenses of surveying and monument-  
ing the sections as set forth above.

That the following sections of the line east of the summit of the Rocky Moun-  
tains should be surveyed and monumented by United States parties accompanied  
by a Canadian representative:

From the summit of the Rocky Mountains to the railroad crossing at  
Sweetgrass, Montana (Coutts, Alberta), Monument 272 to Monu-  
ment 333..... 95 miles

From the first original monument west of Frenchman Creek to the first  
monument west of west branch of Short Creek, Monument 478 to  
Monument 620..... 208 miles

From the first monument west of Red River to the Northwesternmost  
Point of Lake of the Woods, Monument 832 to Monument 925... 115 miles

Total..... 418 miles

and the following sections of the line east of the summit of the Rocky Mountains  
should be surveyed and monumented by Canadian parties accompanied by a United  
States representative:

From Coutts, Alberta, to the first original monument west of French-  
man Creek, Monument 333 to Monument 478..... 207 miles

From the first monument west of west branch of Short Creek to the  
first monument west of Red River, Monument 620 to Monu-  
ment 832..... 255 miles

Total..... 462 miles

and that each Government should bear all the expenses of surveying and monu-  
menting the sections as set forth above.

IV. That east of the summit of the Rocky Mountains, in following the pro-  
vision of the treaty of 1908 which reads: "In the intervals between the monuments  
along the parallel of latitude, it is agreed that the line has the curvature of a parallel  
of 49° north latitude; and that such characteristic shall determine all questions that

<sup>2</sup> The spelling authorized by the United States Board on Geographical Names is *Kootenai*; by the Geographic  
Board of Canada, *Kootenay*.

may hereafter arise with reference to the position of the boundary at any point between neighboring monuments", that all intermediate monument locations should be determined by offsets from the chord joining original monuments and that the intervals between adjacent monument sites should be held down to such lengths that on the ground the straight lines joining adjacent monuments will closely conform to a line joining the original monuments, which has the curvature of a parallel of 49° of north latitude.

V. That west of the summit of the Rocky Mountains the boundary line should be marked by aluminum-bronze monuments, set in concrete bases, at prominent places, such as roads, trails, and stream crossings, and so located that adjacent monuments will be intervisible where practicable; that the distance between monuments should not exceed 3 miles, save in very exceptional cases where 4 miles should not be exceeded; and that all monuments, recognized by the Commission of 1857-1869 as being on the line, should be replaced by new monuments, except Monument No. 1 (the obelisk at Point Roberts) and a few original monuments at sites where permanent monuments cannot be maintained.

And that, from the summit of the Rocky Mountains east to the North Fork of Milk River, the boundary line should be marked by aluminum-bronze monuments set under the same specifications as to distance apart and intervisibility as those set west of the summit. That from the North Fork of Milk River east to Lake of the Woods one-piece hollow cast-iron monuments, filled with concrete, identical in form with those set in 1872-1875, should be set to mark the boundary at distances apart not to exceed 2 miles except in a few exceptional cases, where 2¼ miles should not be exceeded; and that adjacent monuments should be made intervisible where practicable.

VI. That each monument should bear a suitable number, cast in raised letters or outlined in drill holes in the metal, to identify it on the ground, in the joint report of the Commissioners, and on the boundary maps.

VII. That the boundary through timbered areas should be further marked by a vista of sufficient width to give a cleared 20-foot sky line along the boundary.<sup>3</sup>

VIII. That, for the purpose of accurately defining, locating, and describing the boundary as laid down by the Commissioners, all boundary monuments and boundary reference monuments should be located geodetically on the North American datum of 1927 by triangulation or by traverses controlled by triangulation, and their positions should be certified by the Commissioners in their joint report as being a true description and definition of the International Boundary as reestablished, surveyed, and marked in accordance with the instructions issued under the concurrent action of the two Governments in 1902-1903 and in accordance with the provisions of articles VI and VII of the treaty of 1908 and articles I and II of the treaty of 1925.

IX. That the charts of the boundary, specified in articles VI and VII of the treaty of 1908, should consist of a series of 59 topographic maps, to be prepared from surveys made by the Commissioners, showing the boundary monuments, the course of the boundary, and the topography on each side of the line. That the scale of these maps should be 1:62,500. That from the Gulf of Georgia (Georgia Strait) to the eastern foothills of the Rocky Mountains, that is, to longitude 113°30', the topography should be shown on the boundary maps for a minimum distance of 2 miles on each side of the line and a contour interval of 100 feet should be used; that from the eastern foothills of the Rocky Mountains to Lake of the Woods, the topography should be shown for a minimum distance of 1 mile on each side of the boundary and a contour interval of 20 feet or less should be used.

<sup>3</sup> Agreements I to VII were made and carried out in full prior to the conclusion of the treaty of 1925.

X. That the maps of the boundary should be engraved on copper plates and printed from lithographic stones using conventional symbols, and conventional colors, black, brown, blue, and green. That after the completion of the printing and after the signing of the official maps by the Commissioners, the engraved copper plates should be placed in safe storage and later should be equally divided between the two Governments.

XI. That the Commissioners' joint report to the two Governments on the reestablishment of this section of the International Boundary Line, required by articles VI and VII of the treaty of 1908, should be printed and copies thereof should be distributed to other Government agencies and to depository libraries of the two countries.

## RETRACEMENT OF THE BOUNDARY LINE

The work of retracement of the boundary line from the Gulf of Georgia (Georgia Strait) to the Northwesternmost Point of Lake of the Woods, as provided for under the agreement for concurrent action by the two Governments in 1902 and 1903 and under the provisions of the treaty of 1908 and the treaty of 1925, primarily consisted of the recovery and identification of the monuments and marks established in the original demarcation of the line. The original demarcation was that made by the Commissioners of 1857-69 in accordance with the provisions of the treaty of 1846 for that portion of the line west of the Rocky Mountains, and by the Commissioners of 1872-76 in accordance with the provisions of the Convention of London of 1818 and the treaty of 1842 for that portion of the line east of the Rocky Mountains.

For the part of the boundary west of the Rocky Mountains, the identification of the monuments and marks was made through the descriptions and other information contained in the "Table of astronomical and geodetical stations located and determined by the United States and British Commissions from which the 49th parallel of north latitude was defined", the "Table of longitudes of monuments marking the 49th parallel of north latitude", and "The topographic maps of the boundary", jointly signed at Washington on May 7, 1869, by Hawkins and Campbell, the Commissioners of 1857-69. While these comprised the available authoritative definition and description of this boundary, additional useful information was found in the correspondence of Colonel Hawkins, the British Commissioner, in the "Foreign Office Correspondence" of Great Britain. No written joint report of the survey was made. While it is known that Commissioner Campbell made a written report to his Government, unfortunately it was not published, and the manuscript has been lost from view for many years.<sup>1</sup>

The original monuments from Monument 1, the large stone monument on the west shore of Point Roberts, to Monument 43<sup>2</sup> in the Columbia Valley, were all cast-iron pillars set at an average distance of about 1 mile apart. They were all recovered and identified as being in their original positions except Monument 7 which had apparently been moved south about 6 feet in the process of road construction. This monument was shifted to the north to a point on the curve of the 49th parallel as defined by the adjacent monuments, in conformity with the record of its original location.

From the Columbia Valley eastward through the Cascade Mountains to the east bank of the Similkameen River, a distance of about 108 miles, the boundary had been marked by 21 cairns or pyramids of stones and one bench mark cut in bedrock. These marks, numbered 44 to 65, had been set in the principal valleys crossing the boundary, and in some instances were long distances apart. They were

<sup>1</sup> See appendix III, p. 196.

<sup>2</sup> The British system of numbering from west to east is used west of the Rocky Mountains throughout this text.

all recovered and identified except the cairns numbered 44 and 45, in the Tamih Valley. Three cairns had been set here, 44, 45, and 46, a short distance apart, and a vista had been cut between them. Number 46 was recovered and positively identified by a center stake found under the remains of the cairn and by the cuttings of the old vista which were still distinct. The old vista was recut westward from cairn 46, and measurements were made along it to where cairns 45 and 44 should have been according to the records of the original Commission, but falling timber and snow-slides had obliterated all traces thereof. The monuments set to take their places were located in the middle of the original vista, on the curve of the 49th parallel passing through cairn 46, and as nearly as practicable at the longitudes of the original cairns.

From the Similkameen River to the east bank of the Columbia River, a distance of about 95 miles, the boundary had been marked at frequent intervals by cairns, except in one instance where stone could not be found within a reasonable distance. Here, according to statements by Commissioner Hawkins, the mark was built of logs. These marks, numbered 66 to 133, were all recovered except numbers 126, 132, and 133. Number 126 evidently was the log mark. Its general location was identified by the topographic maps, the traces of the original vista, and its relation in longitude to the adjacent cairns. It was relocated in its recorded longitude on the curve of the 49th parallel as defined by these cairns. Cairn number 132 and cairn number 133 which stood 129 yards apart on the gravel bank on the east side of the Columbia River had been destroyed by placer mining operations. Their approximate sites were recovered by measurements from cairn 131 on the west bank of the river and then checked by astronomic observations for latitude and azimuth. These two cairns were eventually replaced by one monument, now numbered 181, set about 20 meters to the west of the original recorded site of cairn 133 and in its original recorded latitude.

From the Columbia River to the summit of the Rocky Mountains the 28 boundary marks, numbered 134 to 161, were all recovered with the exception of cairn 150 on the hillside east of the Yaak\* River. From the evidence on the ground it is probable that no cairn had ever been erected on this site. Cairn 149 being but a short distance to the westward, no attempt was made to recover the exact site of or to replace the missing boundary mark.

Thus 154 of the 161 recorded original marks on the boundary from Georgia Strait to the summit of the Rocky Mountains were recovered and identified as being on their original sites.

The retracement of this section of the boundary was completed by running and marking straight lines between the consecutive original monuments or cairns in conformity with the last paragraph of the minutes of the final meeting of the Commission, dated and signed May 7, 1869, which reads:

It is agreed by the Commissioners that, between any two successive defined points, marked on the ground, shown on the maps, and set forth in the accompanying lists, the line of boundary above described is to be understood to be a right or straight

\*Yaak is the spelling authorized by the United States Board on Geographical Names. Yahk is the spelling authorized by the Geographic Board of Canada.

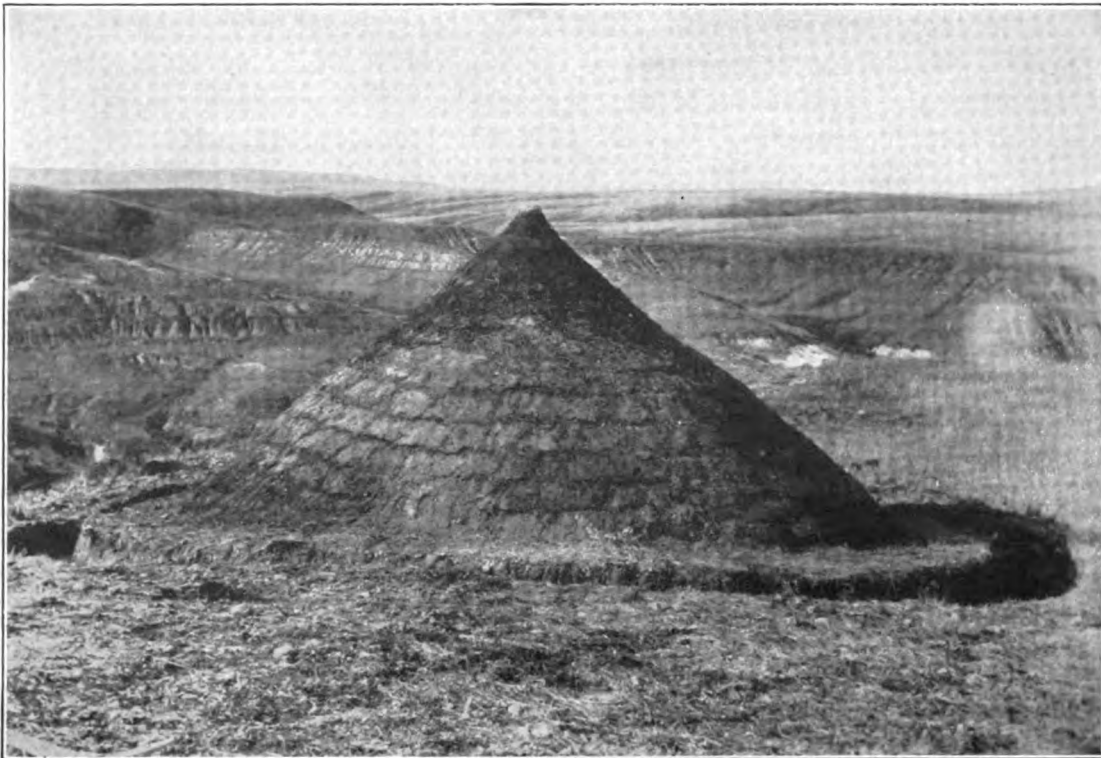
line; and that this rule is to apply throughout the entire boundary without regard to the distances between the consecutive points or to the course of the parallel in such intervals.

This surveying of "straight lines" between the original boundary marks was not easy of accomplishment. The distances were great, sometimes as much as 20 to 25 miles, the exact azimuth of the course to be run was not known, and high

mountain ranges and deep valleys had to be crossed. Great care was exercised in the performance of this work. The results have been fully checked by subsequent triangulation for the purpose of determining the geodetic positions of the monuments,



ORIGINAL BOUNDARY CAIRN 356 EAST OF THE SUMMIT OF THE ROCKY MOUNTAINS, NOW REPLACED BY MONUMENT 331. CAIRN ERECTED IN 1873 OR 1874. PHOTOGRAPHED IN 1910



ONE OF THE EARTH MOUNDS USED TO MARK THE INTERNATIONAL BOUNDARY ON THE PRAIRIE IN 1872-74. PHOTOGRAPH FROM FORMER COMMISSIONER DR. W. F. KING'S COLLECTION OF 1872-74



and the degree of accuracy of the alinement is shown in the tabular description and definition of the boundary line included in this report.

For the boundary east of the summit of the Rocky Mountains the recovery and identification of the boundary marks established in the original survey and demarcation by the Commission of 1872-1876 was made through the information set forth in the protocol of the final proceedings of the Commission signed in London May 29, 1876, including the final records and maps enumerated in the protocol and on file in the Foreign Office in London and in the archives of the Department of State at Washington, and in the detailed report of the United States Commissioner to the Secretary of State.

The 388 original boundary marks established by the Commission to mark this section of the boundary were recovered and identified with but one exception, original cairn 213, in the town of Portal, North Dakota. The site of this cairn was recovered by its recorded position relative to the next neighboring unobliterated marks, numbers 212 and 214, as provided for in the protocol of the Commissioners of May 29, 1876. The new monument is now numbered 630.

After the recovery of the monuments and cairns marking the line east of the summit of the Rocky Mountains, the retracement was completed on that part of the boundary by surveying and marking the line on the curve of the 49th parallel between the consecutive original boundary marks as provided for in the second article of the agreements of the original Commissioners.<sup>3</sup>

On the meridian line from the Northwesternmost Point of Lake of the Woods to the 49th parallel the retracement of the line was made in accordance with the first article of the agreements of the original Commissioners as given in the proceedings of their final meeting, May 29, 1876, which reads as follows:

The three hundred and eighty-eight (388) monuments detailed in the list referred to in section *b* of paragraph numbered one, are on and mark the astronomic lines stipulated by the second article of the Convention of London (signed October 20, 1818) to be the line of Boundary between the territories of Her Britannic Majesty and the United States of America, from the Lake of the Woods to the Stony (i. e., Rocky) Mountains.<sup>4</sup>

The astronomic lines referred to above are the 49th parallel and the meridian line.

The meridian, or "due south" line, was accepted as defined by the seven original monuments set by the Commissioners of 1872-1876. After the seven monuments, numbers 1 to 7, were all recovered, the retracement was completed by projecting the straight line through all of the seven monuments southward to its intersection with the 49th parallel in Lake of the Woods, as defined by original cairn 1 of the 49th parallel on the west shore of Lake of the Woods, and by prolonging the said meridian northward to the Northwesternmost Point of Lake of the Woods as selected by Dr. J. L. Tiarks, in 1825, and accepted by the two Governments in the treaty of 1842.

<sup>3</sup> For text of the second article of the agreements, see appendix III, page 217.

The second article of the agreements of the original Commissioners was modified by the treaty of 1925 so that the boundary is now a straight line between consecutive monuments set prior to 1925.

<sup>4</sup> For full text of proceedings of the Commissioners, see page 216.

In making a physical determination of the boundary, however, a situation became apparent that was not desirable to either country. The boundary line following the Northwest Angle Inlet, which had been adopted as a part of the boundary from Lake Superior to the Northwesternmost Point of Lake of the Woods, crossed the meridian boundary as marked by the seven monuments no less than five times,<sup>5</sup> thereby enclosing between the two boundaries two small areas of United States waters in Lake of the Woods, containing but 2½ acres, entirely surrounded by Canadian waters.<sup>6</sup>

Upon the recommendation of the Commissioners, the parts of the north-and-south line and of the line in the channel lying northward of their most southern intersection were eliminated from the International Boundary by the treaty signed at Washington February 24, 1925.<sup>7</sup>

The boundary from the Gulf of Georgia (Georgia Strait) to the Northwesternmost Point of Lake of the Woods as thus retraced was marked throughout by replacing the original monuments and other marks with new monuments where necessary and by setting intermediate monuments on the lines established between the old marks.<sup>8</sup>

Since the adoption of the treaty of 1925 all new marks and monuments set in the course of maintenance work have been set with due regard to the provisions of articles I and II<sup>9</sup> of that treaty.

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<sup>5</sup> See details, page 141, and map, page 138.

<sup>6</sup> Treaty of 1925, page 12.

<sup>7</sup> See article I of the treaty, page 11.

<sup>8</sup> See chapter on Monuments and Monumenting, page 115.

<sup>9</sup> For text of treaty, see page 11.

## FIELD OPERATIONS

The field operations of the resurvey and remonumenting of the International Boundary Line from the Gulf of Georgia (Georgia Strait) to the Northwesternmost Point of Lake of the Woods were begun in the spring of 1901 and were carried on each successive season with varying forces and under varying conditions until 1914. After the last date small amounts of field work were done in 1917, 1918, 1919, 1921, 1922, and, after the adoption of the treaty of 1925, in 1926 and each successive year thereafter.

As a result of an informal exchange of notes <sup>1</sup> between the two Governments regarding the need of more effectively marking parts of the 49th parallel land boundary west of the summit of the Rocky Mountains, independent though cooperating parties of both Governments were placed in the field in the summer of 1901 to make a general reconnaissance. The reconnaissance was continued, by Canadian parties only, in 1902. The data gathered by these reconnaissances were used in formulating the terms of "concurrent action" <sup>2</sup> of the two Governments in 1902 and 1903 under which representatives or commissioners were designated to act jointly in renewing lost or damaged monuments and in placing additional monuments on the part of the boundary lying west of the Rocky Mountains. Following the appointment of Commissioners, and under their direction, constructive work was undertaken by separate United States and Canadian parties operating each season from 1903 to 1907. The work during this period included a complete retracement of the original boundary, the monumenting thereof, the cutting of a vista through the timbered sections, the execution of a scheme of triangulation for topographic control, and the making of modern topographic maps covering the entire boundary.

On April 11, 1908, the treaty providing for the more complete definition and demarcation of the International Boundary between the United States and the Dominion of Canada from the Atlantic Ocean to the Pacific Ocean was concluded between the two Governments. Upon the conclusion of the treaty, field operations on the boundary west of the summit of the Rocky Mountains were carried to completion under the provisions of article VII of the treaty.

East of the summit of the Rocky Mountains the work was done by separate United States and Canadian parties accompanied by representatives of the other Government. Work was begun immediately following the conclusion of the treaty of 1908 providing for it, and was carried on each successive season until 1914. By this time the work of retracing, remonumenting, vista cutting, triangulation, and mapping had been virtually completed. Later, office computations of the geographic positions of the boundary monuments showed that supplemental triangulation or traverse should be done east of the summit of the Rocky Mountains to make sure

<sup>1</sup> See diplomatic correspondence: Appendix II, page 192.

<sup>2</sup> See concurrent action: Appendix II, page 193.

that the monuments interpolated between monuments of the original survey had been correctly placed on the arc of the parallel. This work was done by small United States parties in 1917, 1918, 1919, and 1921.

In 1922 a small joint party was sent to the western end of the boundary line to make additional surveys which had not seemed necessary in the earlier days of the work, to recut the vista from Monument 1 to Monument 43, and to repair damaged monuments.

The demarcation of the boundary was now virtually completed, the exceptions being the geodetic determination of a number of monuments west of the summit of the Rocky Mountains and the adjustment of all the monument positions to the North American geodetic datum. The necessary triangulation and traverse were done subsequent to the adoption of the North American datum of 1927 and in conjunction with boundary maintenance under article IV of the treaty of 1925.

The technical details of the field operations will be found in the chapter on "Field and Office Methods and Results."

#### SEASON OF 1901—RECONNAISSANCE WEST OF THE ROCKY MOUNTAINS

The field work carried on in 1901 was a reconnaissance of that part of the boundary lying west of the summit of the Rocky Mountains. Its immediate purpose was to satisfy the current demand for the identification of the boundary in certain places and to furnish the two Governments with more complete information relative to the condition of the line preparatory to making plans for a more complete resurvey and demarcation of the entire boundary between their territories.

One Canadian party was assigned to the section of the boundary between Point Roberts and the Skagit River, referred to hereafter as the western Canadian party, and one to the section of the boundary between the Similkameen and Columbia Rivers, hereafter referred to as the eastern Canadian party. A geologist<sup>3</sup> and a naturalist were attached to the western Canadian party. The United States group consisted of an astronomic party, a topographic party, and three geologic reconnaissance parties. The astronomic and topographic parties were assigned to the parts of the boundary where local misunderstanding regarding its location had arisen—more particularly across the valley of Silesia Creek;<sup>4</sup> between Midway, British Columbia, and Cascade, British Columbia; and in the vicinities of Gateway, Montana, Tobacco Plains, and Wigwam River. The first geologic reconnaissance party was to operate between Point Roberts and Osoyoos Lake, and the second

<sup>3</sup> The same geologist, R. A. Daly, with a subparty was attached to the Canadian boundary survey party each year to and including 1906. A detailed geological report based upon his field work, which covered the entire mountain section traversed by the International Boundary, under the title "Geology of the North American Cordillera at the Forty-ninth Parallel", by Reginald Aldworth Daly, was published in three volumes as an appendix to the report of the chief astronomer of the Department of the Interior of Canada, for the year ended March 31, 1910. The report was republished as "Memoir No. 38, Department of Mines, Geological Survey of Canada, 1912." As Dr. Daly's work did not include identification or survey of the boundary it will not be further referred to in this report.

<sup>4</sup> *Silesia Creek* is the spelling authorized by the United States Board on Geographical Names. Early spellings appear on maps as *Senesay*, *Senesai*, *Slesse*, and *Selacee*.

between Osoyoos Lake and the west crossing of the Kootenai<sup>5</sup> River at Porthill, Idaho; and the third from the west crossing of the Kootenai River at Porthill, Idaho, to the summit of the Rocky Mountains.

The general instructions to the parties were to find out, in the sections assigned to each: first, what parts of the boundary surveyed and marked between 1857 and 1861 were still recognizable; second, whether such parts corresponded to the true



INSTRUMENT PIER USED IN 1859-60 AT THE SENEHSAI LATITUDE STATION ON SILESIA CREEK. PHOTOGRAPHED IN 1901

treaty boundary, namely, the astronomic 49th parallel of north latitude; third, what parts of the boundary had not been surveyed and effectively marked, and what points should be marked to constitute a certain and effective location of the 49th parallel boundary throughout its course from the summit of the Rocky Mountains westward to the Gulf of Georgia (Georgia Strait).

#### WESTERN CANADIAN PARTY

The western Canadian party was organized late in May at Chilliwack, British

Columbia. The section of the boundary on which they were to be engaged, from the Skagit River on the east to the coastal plain at the base of the Cascade Mountains on the west, presents more barriers to travel and to survey for a distance of about 50 miles than any other section of the parallel. The mountain crests rise to heights as great as eight and nine thousand feet. The valleys between them are deep and narrow and with sides so steep and precipitous that in many instances the rise from the valleys to the crests is as great as 6,000 feet in a distance of two miles. Rain and snowfall are extreme. Damp climatic conditions have fostered a forest growth of an immense size and density that covers the whole region except on the highest summits. Fallen timber, dense underbrush, rock slides, cliffs, precipices, the steepness of the mountain slopes, and the numerous glaciers of the higher peaks, all combine to make travel and surveying difficult and dangerous.

The party moved up the Chilliwack Valley to the mouth of Silesia Creek and from there made a side trip up Silesia Creek to the boundary to meet the United States topographic and astronomic parties which had preceded them over the same route a few days before. As this was one of the places where misunderstanding existed as to the location of the boundary, it was deemed advisable that both Governments should be represented. Here an old post which had recently been mistaken by prospectors for a mark on the boundary was positively identified as being

<sup>5</sup> *Kootenai* is the spelling authorized by the United States Board on Geographical Names. *Kootenay* is the spelling authorized by the Geographic Board of Canada.

the latitude observation post, 343 feet north of the boundary, used by the Commission of 1857-69. Starting at this post a traverse was run the required distance south to the boundary disclosing and positively identifying cairn 47<sup>6</sup> (now Monument 55) and other boundary marks.

The United States party remained to mark the boundary while the Canadians returned to the mouth of Silesia Creek and turned their attention to trail building up the Chilliwack River. After several days of arduous work the Canadian party reached the mouth of Middle Creek where it became necessary to bridge the Chilliwack River. This was done by felling a fir tree 8 feet in diameter across the stream and flattening the top surface for a foot walk for the pack animals. From the camp at the mouth of Middle Creek a trail was opened for about 2 miles up Middle Creek and the trail up the river was completed to the foot of Chilliwack Lake.

Trail building did not appear practicable along the precipitous and rugged sides of Chilliwack Lake. Therefore, a cache was built at the foot of the lake and arrangements made for the pack train to make weekly trips to Chilliwack for mail and supplies. A large raft and a cedar dugout canoe were made with which to traverse the lake. Using these, and with the aid of a fair wind, the outfits were transported to the head of the lake and camp was pitched on the bank of Dolly Varden Creek about one-half mile from the head of the lake and near the boundary.

From the camp on Dolly Varden Creek, boundary cairns 50 and 51 (now replaced by Monuments 62 and 63) were found in good condition. A vista was opened along the tangent to the parallel to the summit of the ridge on either side of the creek, and phototopographic surveys were made.

When this work was completed, the party moved down the lake to the mouth of Depot Creek and set up camp on the site of the old survey camp of 1857. They found near the camp the headboard of the grave of a soldier who had been a member of the military escort of the original survey party. The rough cedar cross carried an inscription to the effect that here was buried Michael Brown, a native of County Galway, Ireland, who was drowned in 1858, and was buried by his comrades of Company F, 9th Infantry, U. S. Army. A clearing was made around the grave and the headboard was renewed.<sup>7</sup>

<sup>6</sup> Original boundary cairns and monuments are referred to by their numbers from west to east unless specifically stated otherwise.

<sup>7</sup> In 1935 a Canadian party reported that the cedar cross marking the grave had become so decayed that it could no longer be maintained. The personnel of the Boundary Commission referred the condition of the grave to the War Department of the United States with the result that the Department furnished a suitable marble slab carrying the full inscription found on the wooden cross, and during the summer of 1936 the personnel of the Boundary Commission, both Canadian and United States, erected the marble slab, set in a solid concrete base, over the grave. A substantial contribution toward the cost of this work was made by the present Company F.



HEADSTONE OVER THE GRAVE OF MICHAEL BROWN, ERECTED BY THE INTERNATIONAL BOUNDARY COMMISSION, 1936, WITH THE COOPERATION OF THE UNITED STATES ARMY

A foot trail was opened up Depot Creek and a side camp made at the end of the trail near the boundary. From this camp, boundary cairn 52 (now Monument 65) was found, as firm and symmetrical as the day it was built. The old vista was cleared for some distance east of the cairn and also 1,000 feet westward to Depot Creek.

The party now returned to the main camp at the mouth of Depot Creek and moved by raft down the lake to the cache where the pack train awaited them. A move was then made by pack train down the Chilliwack to the mouth of Middle Creek and up that creek the 2 miles to the end of the trail cut earlier in the season. The next two weeks were spent in cutting trail and moving up Middle Creek to the boundary crossing. The old latitude station a short distance north of the line, a boundary mark chiseled on the face of a rock and originally numbered as monument 48 (now Monument 57), and boundary cairn 49 (now Monument 58) were found. The old vista was opened for about 2 miles east and for a short distance west of the boundary marks. The party then retraced their steps down the Chilliwack Valley to the mouth of Tamihi Creek. A horse trail was opened up the rugged valley of the Tamihi for about 6 miles, and a foot trail the remaining distance to the boundary. The old vista along the line was easily found, but the boundary cairns were not found at this time.

Stormy weather forced the party to withdraw from the valley to lower altitudes on September 15. The move was down the Chilliwack and around by Sumas Prairie to Monument 41. From here, working westward, they opened up the old vista to Semiahmoo<sup>8</sup> Bay and inspected all the monuments to No. 1, on Point Roberts. All of the monuments were found in place except Monument 7, which had evidently been moved about 6 feet south by road builders. Several others were found slightly damaged. The field season ended on November 15.

The personnel of the western Canadian party was: Chief of party, J. J. McArthur, D. L. S.; assistants, J. M. Bates, E. T. de Coeli, J. W. McArthur; naturalist, J. M. Macoun; assistant naturalist, Wm. Spreadborough; geologist, R. A. Daly; and 10 hands.

#### EASTERN CANADIAN PARTY

The eastern Canadian party was organized at Midway, British Columbia, on May 15. It consisted of 15 men and was provided with 15 pack horses. The party began field work at boundary cairn 98 (now Monument 143) and worked westward.

Before much progress had been made, the United States topographic and astronomic parties arrived at Midway, and a consultation between the chiefs of the Canadian and United States parties resulted in an agreement that the Canadian party should continue work westward to the Similkameen River and the United States parties should work eastward from Midway to Cascade.

The Canadian party examined all the boundary marks westward to boundary cairn 64 (now Monument 109) on the west side of the Similkameen River and found

<sup>8</sup> *Semiahmoo* is the spelling authorized by the United States Board on Geographical Names. *Semiamu* is the spelling authorized by the Geographic Board of Canada.

them in good condition. They opened a vista from 6 to 10 feet wide along the boundary throughout the entire distance and also measured the deflection angles of the line at the boundary cairns.

This work was on the section of the boundary where the Commission of 1857–1869 had first run and marked as the boundary a line joining points on the astronomic parallel and later had adopted a mean parallel in lieu thereof. They had erected cairn monuments on the line joining the astronomic points and cut a continuous vista. When the line was changed to a mean parallel, new monuments were erected and those on the abandoned line, with one exception—cairn 96 (now Monument 141) on the high summit just south of Midway—were torn down. A vista on the mean parallel line was cut only near the cairn monuments and on the prominent summits. This left two lines marked, one, the abandoned line, well marked by vista and still showing the remains of the cairns; the other, the adopted line, poorly marked by the vista and monumented throughout with cairns. These two marked lines later caused the confusion which existed among local residents in regard to the location of the boundary when the reconnaissance of 1901 was undertaken.

After completing the work between Midway and the Similkameen River, the Canadian party proceeded to Cascade and carried on similar operations between boundary cairns 120 and 127 (now Monuments 166 and 174). In addition to retracing the boundary and cutting the vista, they did phototopography during the entire season.

The party was forced by unfavorable weather to retire from the field on October 22, without reaching their hoped-for objective on the Columbia River.

The personnel of the eastern Canadian party was: Chief of party, W. F. O'Hara, D. L. S.; assistants, Bruce Strachan, J. M. Sheppard; and 12 hands.

#### UNITED STATES ASTRONOMIC AND TOPOGRAPHIC PARTIES

The United States astronomic and topographic parties were organized in Seattle, Washington, early in May. They were under instructions to cooperate and to supplement each other's work. As soon as organization was completed they proceeded to Chilliwack, British Columbia, stopping on the way at New Whatcom (now Bellingham), Washington, to confer with prospectors who had located mining claims on Silesia Creek and were in doubt as to the location of the boundary across that stream.

At Chilliwack additional hands were employed and a pack train was hired for transportation to the boundary. The parties proceeded to the boundary, traveling up the Chilliwack River and Silesia Creek, over almost impassable trails, for a distance of 32 miles. They reached the boundary on May 23 and went into camp on Silesia Creek near the old observation post of the latitude station of 1859.

The astronomic party made latitude observations at the old station and obtained results which closely approximated those of the observations of 1859. They then ran a traverse south, following the creek bottom, the requisite distance from the station to the boundary. A search for the boundary cairn was then made. After clearing the tangle of underbrush and weeds, a circular pile of stones about 6 feet in diameter and 1 foot high, having the appearance of being artificial, was



found amid drift carried down by floods. No center stake or mark was found under it, but measurements made to a Y cut in a large boulder on the west side of Silesia Creek, to which measurements had been made in 1859, verified the stone pile as being the remains of boundary cairn 47 (now Monument 55).

In the absence of a center mark, the center of the stone pile was accepted as marking the boundary line, a center mark was made, and the cairn rebuilt to a height of about 3 feet. An azimuth was observed here and the boundary projected to the summits of the ridges both east and west of the creek. This line was not cleared continuously but was plainly blazed where not cleared. The boundary thus identified was temporarily marked by an iron post set in a mound of stone 3 feet high, 6 feet east of the boundary cairn; by an iron post set on the summit of the ridge 4,000 feet west of the boundary cairn; by an iron post set on the summit of a spur ridge 6,000 feet east of the boundary cairn; and by an iron post set on the summit of an intervening spur ridge east of the boundary cairn. The old post used for a latitude station was also marked. An iron post was set 2 feet west of the latitude station and a bronze disk was set 15.8 feet southeast of it in a large granite boulder.

While the work of the astronomic party was going on, the topographic party mapped the adjacent territory. Ground conditions being very unfavorable for a tape-measured base, a base was measured by stadia across a ravine and connected with the astronomic station. A scheme of plane-table triangulation was executed from the ends of the base to the nearby mountain tops and a closely estimated elevation was assumed. With this control, a topographic map was made, on a scale of 1:45,000 and a contour interval of 100 feet, of a strip of territory 2 miles wide on each side of the boundary, by about 5 miles long, from summit to summit across the Silesia Creek valley.

As previously stated, during the progress of the work on Silesia Creek, the United States parties were visited by members of the western Canadian party who examined the recovered boundary marks and confirmed their authenticity.

The work of all the parties was greatly hampered by heavy rains and cloudy weather, and what should have been accomplished in a few days was not completed until June 23. On June 24 the United States parties returned to Chilliwack and from there traveled by train over the Canadian Pacific Railway to Midway, British Columbia, there to take up work on the second section of the line where local misunderstandings had arisen as to the location of the boundary. They found the eastern Canadian party in camp about 10 miles west of Midway.

According to the agreement between the chiefs of party already related, the United States parties took up work to the eastward. They began work by measuring a base with a steel tape on the open flats near Midway from which was developed a scheme of triangulation eastward along both sides of the boundary for plane-table control.

As work progressed three astronomic stations were established at which latitude and azimuth were observed: the first near Midway on the boundary on the bank of Boundary Creek near boundary cairn 98 (now Monument 143); the second near Carson, British Columbia, at boundary cairn 108 (now Monument 153); and

the third near Russell (now Laurier) at boundary cairn 119 (now Monument 164). Meridian lines were established and marked by iron posts at all three of these stations.

The boundary line was resurveyed from boundary cairn 96 (now Monument 141) to boundary cairn 112 (now Monument 157) and marked by cutting a vista. Along this interval the deflections of the line at the monuments were measured with a theodolite, the distances between monuments measured by stadia readings, and the adjoining country was mapped.

Boundary cairns from 96 (now Monument 141) to 112 (now Monument 157) were all recovered, and with but two exceptions were found in good condition. These two cairns were rebuilt. Cairns 119 to 122 were also visited and found in good condition.

Upon the conclusion, on August 12, of these operations, the parties moved eastward to the Gateway, Tobacco Plains, and Wigwam districts.

In these districts boundary cairns 6, 7, 8, 9, and 10, numbered west from the summit of the Rocky Mountains (now replaced by monuments numbered 255, 254, 247, 245, and 243), were recovered. The original vista across the Wigwam Valley between cairns 6 and 7 was still discernible. At cairn 8 the old vista extended about one-half mile to the east and was continuous to the west to the foot of the mountain west of the Kootenai River, a distance of about  $9\frac{1}{2}$  miles. Latitude and azimuth were observed at stations near boundary cairn 6 in the Wigwam Valley, near cairn 8 at Phillipps Creek, and near cairn 9 on the bench on the east side of the Kootenai River. Azimuth lines were established and marked with iron posts at all three of the azimuth stations, those near boundary cairns 8 and 9 were placed on the meridian, the one near cairn 6 was placed on the tangent. The 13-mile chord between cairns 7 and 8 was run out and from it the curve of the mean parallel<sup>9</sup> between the two cairns was established and opened up by cutting a vista along its entire length. This vista was continued eastward on the tangent to the parallel for some distance beyond cairn 6. The boundary was temporarily marked by setting five iron posts at prominent places on the curve between cairns 7 and 8 and an iron post on the line about midway between cairns 8 and 9. Boundary cairns were repaired or rebuilt as their condition demanded.

A topographic map was made covering a strip 2 miles on each side of the boundary from the Kootenai River to the summit of the ridge on the east side of the Wigwam Valley. The control for this map was a scheme of triangulation extending over the entire area mapped and developed from a base measured with a steel tape on the flats near Phillipps Creek. The topographic control included a stadia profile of the boundary from cairn 6 to cairn 10.

The astronomic party completed work here before the topographic party did. Leaving the latter to finish the mapping, they moved west to Waneta, British Columbia, near where the 49th parallel crosses the Columbia River.

In 1859 and 1860 the Boundary Commissioners had marked the boundary crossing of the Columbia River by a cairn on the west bank of the river and two

<sup>9</sup> This was an error on the part of the engineers in charge, as the line should have followed the chord. The error was corrected in the final survey.

cairns 129 yards apart on the high gravel bar on the east bank. The astronomic party of 1901 was unable to find any trace of the two cairns on the east side of the river, as the gravel bar had been entirely worked over by placer miners. The approximate sites of the two cairns on the east bank of the river were recovered by measurements from the cairn on the west bank, and an astronomic station was established nearby and marked with an iron post at which latitude and azimuth were observed. This concluded the season's work of the astronomic party, and it proceeded to Spokane and disbanded on October 18.

In the meantime, the topographic party had completed its work in the East Kootenai district, moved its outfit to Kalispell, Montana, and disbanded on October 18.

The personnel of these two parties was: United States astronomic party: Chief of party, C. H. Sinclair; assistants, H. F. Flynn, O. B. French; and two hands. United States topographic party: Chief of party, E. C. Barnard; assistant, Horace Dunaway; and four hands. Additional hands were employed locally from time to time by both parties as needed.

#### FIRST UNITED STATES GEOLOGIC PARTY—POINT ROBERTS TO OSOYOOS LAKE

The first United States geologic party was organized at Ellensburg, Washington. A pack train belonging to the United States Geological Survey, which had been wintered in the valley nearby, was obtained to provide transportation in the rugged mountain country to be examined.

The work of this party was largely to make a geologic reconnaissance and to collect information regarding the physical characteristics of the border country, as well as to identify cairns and vista cuttings marking the boundary.

On June 21 the party left Ellensburg en route for the boundary. The route lay across Table Mountain to Wenatchee, thence up the west side of the Columbia and Okanogan Rivers to the junction of the Similkameen and Okanogan Rivers, about 5 miles south of the boundary. A geologic reconnaissance was made along the route.

Work at the boundary was begun from the camp at the junction of the Similkameen and Okanogan Rivers on July 10. In connection with the geologic reconnaissance, boundary cairn 72 (now Monument 117) on the west bank of Osoyoos Lake and boundary cairn 71 (now Monument 116) were visited and found to be in good condition.

The party's next move was westward to Palmer Lake, where boundary cairns 64 to 70 (now Monuments 109 to 115) were all found without difficulty.

Up to this time the country covered had been open and easy of access and no difficulties of travel had been experienced. West of boundary cairn 64 (now Monument 109) on the Similkameen River the character of the country abruptly changes. The mountains are high and rugged, the valleys heavily timbered up the steep slopes nearly to the tops of the mountains. The country was unsettled and practically without trails.

The party entered this country from Palmer Lake and carried their reconnaissance westward along the line. Boundary cairns 61, 62, and 63 (now Monuments

99, 100, and 101) were recovered in the valley of a tributary of the Ashnola River on July 26. The vista across the valley was easily identified and the old astronomic station with its log cabin built 42 years before was found undisturbed.

Continuing westward the party recovered boundary cairns 59 and 60 (now Monuments 85 and 86) on opposite sides of the Pasayten River, on August 13. The location of these cairns required a three-days' trip on foot from the nearest point reached by the pack train. Boundary cairns 57 and 58 (now Monuments 81 and 82) in the Chuchuwanten Valley were not found at this time, although four days were spent in searching up and down both sides of the valley for signs of the old vista, and one day in running a traverse from cairn 59 to locate the boundary crossing.

From the Pasayten Valley the route of travel was across the mountains to Slate Creek and thence down Slate and Ruby Creeks to the Skagit River, where a camp was made at the mouth of Ruby Creek.

The chief of party accompanied by one man made a trip on foot from the camp at the mouth of Ruby Creek over the abandoned Fort Hope trail 30 miles up the Skagit River to the boundary crossing. There they found signs of the old cuttings of the vista on the east side of the river and boundary cairn 56 (now Monument 72). They did not cross the river to search for boundary cairn 55. Low hanging clouds prevented them from noting if any signs of the vista still remained on the west side of the river.

Upon the return of the chief of party from this trip, camp was moved down the Skagit River to Sedro Woolley, Washington, thence northward to Demming, Washington, in the valley of the Nooksack River and into the Mount Baker mining district. The chief of party, himself, upon reaching the railroad, went by train to



ORIGINAL BOUNDARY CAIRN 61, ERECTED IN THE SURVEY OF 1858-62, NOW REPLACED BY MONUMENT 99. PHOTOGRAPHED IN 1905

Maple Falls, Washington, and from there, on September 16 and 17, visited iron Monuments 40 to 43 (present numbers the same). From a camp at Twin Lakes a trip was made by the chief of party on September 20 and 21 down Tamihi Creek northward to the boundary. Cairn 46 (now Monument 52) was found. The search for cairn 45 (now Monument 51) was unsuccessful and limited food supplies prevented a search for cairn 44 (now Monument 50).

On September 26 a trip was made from a camp at the head of the state trail westward to Hannegan Pass at the head of Chilliwack (Dolly Varden) Creek with the intention of continuing down the Chilliwack to the boundary, but snow having begun to fall and the route being without trails, the party turned back.

Work in the mountains was discontinued on October 1, and the pack train, in charge of the assistant geologist, was started on the return trip to winter quarters at Ellensburg, Washington.

Boundary operations were continued by the chief of party from the towns of Sumas and Blaine, Washington. At Sumas he found the western Canadian party cutting vista along the line. After a conference with the chief of the Canadian party he continued to the shore of Semiahmoo Bay, the western limit of the work assigned to him, and completed his season's work by examining Monuments 5, 6, and 7 on October 5.

The personnel of the first United States geologic party was: Chief of party, George Otis Smith; assistant, Frank C. Calkins; and four hands.

#### SECOND UNITED STATES GEOLOGIC PARTY—WEST CROSSING OF THE KOOTENAI RIVER TO OSOYOOS LAKE

The second United States geologic party was organized at Bonners Ferry, Idaho, on June 20. The party consisted of five men with eleven pack horses.

From Bonners Ferry the party proceeded to Porthill, Idaho, on the east bank of the Kootenai River immediately south of the boundary. The Kootenai was in flood and had overflowed the valley to a width of three miles. The crossing of the stream was difficult, but was effected by means of a small scow and two rowboats. The transfer of the party to the west bank of the river was accomplished on June 24 and camp was made on the boundary near the mouth of Boundary Creek. Three days were spent in this camp doing such work as an almost continuous rain would permit. Among other things accomplished was the recovery of boundary cairn 139 (now Monument 206).

The party then moved up Boundary Creek over the Continental Mine trail. After devoting a day to visiting the Continental Mine on the head of Blue Joe Creek they continued on to Summit Lake at the head of Boundary Creek, which was reached on June 30. Six days, during which rain and snow continued to fall, were spent here in making geologic observations and studying the country for practicable routes of travel. The party then turned northward, following the old Copper Camp trail, and traveled through slush and mire and the previous winter's snows to the old Dewdney Trail on Summit Creek. This old trail, well laid out and once well traveled, though now long in disuse and in bad condition, provided the best

route for travel westward. It was followed up Summit Creek, across the divide, and thence down Lost Creek for 8 or 10 miles to a point from which the party made its way by other trails out to the railroad at Salmo, British Columbia. From Salmo, the party made an excursion to the South Fork of Salmon River and carried on an unsuccessful search for the boundary cairn (now Monument 193) on the west side of that stream.

On July 17 the party crossed Salmon River by swimming the horses near the mouth of South Fork and passed down Salmon River to its junction with Clark Fork (Pend-d'Oreille) River where camp was made for a few days. From this camp and from another at Sullivan Lake east of Metaline, Washington, quite an extensive geologic reconnaissance was carried on and the boundary cairn (now Monument 188) on the east bank of Clark Fork <sup>10</sup> was recovered.

The party then continued westward. Swimming their horses across Clark Fork at Metaline they went to Northport, Washington, on the Columbia River and made camp nearby. From this camp the greater part of the basin of Sheep Creek and the boundary across it and east to the Columbia River were reconnoitered. Boundary cairns now replaced by Monuments 171, 174, 179, and 180 were found.

On August 5 the party moved down the Columbia to Marble Ferry, Washington, and thence westward to Flat Creek. From that point the country was much more open than to the east and was well traversed by roads and trails. The party moved with comparative ease and rapidity. They worked westward to Pierre Lake, thence up the Kettle River through Laurier, Washington; Cascade and Grand Forks, British Columbia; and Danville and Curlew, Washington, to the mouth of Toroda Creek. From Toroda Creek the route was through Chesaw and Molson, Washington, to Oroville, Washington, at the foot of Osoyoos Lake. Work was concluded at Oroville early in September and the pack train in charge of the assistant was sent back over open and traveled roads to Bonners Ferry, Idaho, where the party was disbanded on September 27.

The personnel of the second United States geologic party was: Chief of party, F. L. Ransome; assistant, W. J. Sinclair; and three hands.

### THIRD UNITED STATES GEOLOGIC PARTY—KOOTENAI RIVER AT PORTHILL, IDAHO, TO SUMMIT OF THE ROCKY MOUNTAINS

The third United States geologic party was organized at Blackfoot, Montana, on June 20. It started out with six men and eighteen pack animals. From the time of its organization until August 10 it was engaged in a general geologic reconnaissance westward from Blackfoot across the summit of the Rocky Mountains to Lake McDonald, thus covering an area not directly related to the examination of the boundary.

Leaving Lake McDonald the party crossed the Flathead River and thence traveled up that stream to the mouth of Kintla Creek. Several geologic excursions were made in this vicinity, and on August 24 the party was in camp on the west bank

<sup>10</sup> *Clark Fork* is the name authorized by the United States Board on Geographical Names. *Pend-d'Oreille* is the name authorized by the Geographic Board of Canada.

of the Flathead opposite the mouth of Kishenehn Creek. Leaving the main outfit here an excursion was made up the Kintla Lakes to the main divide of the Rocky Mountains to seek the boundary cairn marking the summit of the Rocky Mountains (now Monument 272), and to extend the geologic study of the region. In view of the ruggedness of the main divide and its difficulty of access in many places, a topographic survey was carried forward by plane-table triangulation to assist in locating the boundary cairn on the crest of the divide. By this means, the cairn was readily found. Upon the return of the party to the Flathead River, an excursion was made on September 2 to the two boundary cairns (now Monuments 265 and 266) on Kishenehn Creek and to the two cairns (now Monuments 261 and 262) on the Flathead River. The cairns were all found in good condition.

The party then proceeded by way of the Grave Creek trail—a route considerably to the south of the boundary—to Tobacco Plains (near Gateway), Montana, passing by that part of the boundary examined by the astronomic and topographic parties.

At Tobacco Plains the party was reduced in number and in equipment in preparation for traveling “light” through the heavily timbered mountains lying in the loop of the Kootenai River between Tobacco Plains and Porthill. The two assistants were detached from the party. Eight of the animals and a large part of the camp outfit were disposed of.

On September 11 the party thus reduced in size and equipment crossed the Kootenai River, using a small skiff for men and outfit and swimming the horses, and after a day spent in reconnoitering, followed the “Dodd Creek (now Young Creek) trail” across the Purcell Range to the East Fork of Yaak River. From the Yaak River camp the boundary on the North Fork of Yaak River was reached and boundary cairns now marked by Monuments 232, 233, and 234 were found.

Camp was then moved down the East Fork, over a trail the packers of the party had cut, to a point about one mile below the junction of the East Fork with the North Fork of the Yaak. From here it was intended to reconnoiter the Yaak Range lying between the Yaak and Moyie Rivers, but travel with a pack train through these mountains was found to be so difficult that the original plan was abandoned. The pack train and main party were sent south over known trails to the railroad at Libby, Montana, while the chief of party with one man and a light camp outfit made his way across the range to the Moyie River in the vicinity of the boundary. In the Moyie Valley an extended but unsuccessful search was made for the boundary cairns marking the crossing of the river. The chief of party then followed the Canadian Pacific Railway from the Moyie Valley to Kitchener, British Columbia, and thence proceeded to Porthill, Idaho, by way of Creston, British Columbia.

Porthill was the western limit of the work assigned to the party and an inspection there of the boundary cairn on the east side of the Kootenai River (now Monument 207) completed the work of the season. The party disbanded at Bonners Ferry, Idaho, on September 22.

The personnel of the third United States geologic party was: Chief of party, Bailey Willis; assistants, Stewart Weller, George I. Finlay; and three hands.

SEASON OF 1902—RECONNAISSANCE WEST OF THE ROCKY  
MOUNTAINS

The western and the eastern Canadian parties engaged in the reconnaissance of the boundary west of the Rocky Mountains in 1901 were compelled to discontinue work by the onset of wintry weather before they fully completed their assignments. In the spring of 1902 both parties returned to the field and began work where it had been discontinued the previous season. These were the only parties on this part of the boundary in 1902.

## WESTERN CANADIAN PARTY—POINT ROBERTS

In May 1902, Mr. J. J. McArthur, D. L. S., opened up the vista along the boundary across Point Roberts from Monument 1 to Monument 4, and did some topographic work in the vicinity. This completed the work left unfinished by the western Canadian party in 1901.

EASTERN CANADIAN PARTY—SIMILKAMEEN RIVER TO SOUTH FORK OF SALMON  
RIVER

The eastern Canadian party of 1902 was organized at Greenwood, British Columbia, on June 1. It consisted of 19 men with a pack train of 15 horses.

As soon as organization was completed the party moved to Midway, British Columbia, and worked west to the Similkameen River over a section of the line covered the season before. Additional and check observations were made and the topography supplemented along the boundary within this distance. Upon the completion of this work the party moved to Cascade, British Columbia, and made a phototopographic survey from boundary cairn 120 to boundary cairn 127 (now Monuments 166 and 174), which work they had been prevented from doing in 1901 by dense smoke from forest fires. The boundary mark designated as No. 126 (now Monument 172) could not be found. The report of Lieutenant Colonel Hawkins, Her Britannic Majesty's Commissioner in 1858-1869, describes this monument as being built of logs, as no stone could be found within a long distance of the line. The log monument had been destroyed by forest fires but charred stumps in the old vista were still in evidence.

From boundary cairn 127 (now Monument 174) operations were continued eastward across the Columbia River to the South Fork of Salmon River. On this section of the line as far as the Columbia River, the chords of the parallel were run out between the boundary monuments, and vistas cut across the summits of the intervening ridges. Across the valley of Little Sheep Creek, occupied by settlements of railway and of mining interests, the line was cleared continuously. A phototopographic survey was carried on along the line and a small scheme of triangulation executed to locate the camera stations. All of the boundary cairns were found as far east as the Columbia River with the exception of cairn 131 (now Monument 180) on the west bank of the Columbia. The remains of this cairn had been identified by United States parties in 1901.



East of the Columbia River, the theoretical chord was run from the iron post set by the United States astronomic party in 1901 at the approximate site of the missing boundary cairn, No. 133, on the east bank of the Columbia toward boundary cairn 134 (now Monument 186). Though cairn 134 was not found, it was determined that the chord fell approximately 150 feet to the north of its position, as indicated by the old vista which was still visible to the east. A theoretical chord was run from boundary cairn 136 (now Monument 188) on the east bank of the Pend-d'Oreille River (Clark Fork) toward boundary mark 137 (a bench mark cut in the face of the rock, now marked by Monument 192) on the ridge west of the South Fork of Salmon River. This fell 476 feet to the north of the mark. These chords were cleared of timber across the summits of the high ridges only.

The operations of the eastern Canadian party, just described, concluded the field work of the season and also completed the reconnaissance jointly undertaken by the two Governments.

The party quit the field on October 25.

The personnel of the eastern Canadian party was: Chief of party, W. F. O'Hara, D. L. S.; assistants, J. M. Bates, T. A. Davies, J. M. Sheppard; naturalist, J. M. Macoun; assistant naturalist, Wm. Spreadborough; geologist, R. A. Daly; and 12 hands.

#### SEASON OF 1903—SOUTH FORK OF SALMON RIVER TO THE SUMMIT OF THE ROCKY MOUNTAINS

The field operations of 1903 constituted the first work on this part of the boundary under concurrent action of the Government of the United States and the Government of Great Britain taken in 1902 and 1903. The work to be undertaken this season was no longer a reconnaissance; it was the beginning of the complete survey, retracement, and remonumenting of the boundary along the 49th parallel of north latitude from the summit of the Rocky Mountains westward to the eastern shore of the "Gulf of Georgia."

As in all subsequent operations, the work was conducted by separate field parties of each Government and was directed by Commissioners appointed by the two Governments to act jointly. There were three parties in the field in 1903: a Canadian party assigned to work on the section of the line from the crossing of the Kettle River near Laurier, Washington, and Cascade, British Columbia, to the crossing of the Kootenai River at Porthill, Idaho; and two United States parties, one specializing in astronomic and geodetic work and one specializing in topographic mapping, both assigned to work on the boundary from the crossing of the Kootenai River at Porthill, Idaho, to the summit of the Rocky Mountains.

#### CANADIAN PARTY—WEST OF PORTHILL, IDAHO

The Canadian party of 1903 was assembled at Rossland, British Columbia, on June 2. It consisted of 23 men and was provided for field transportation with the 15 head of pack horses left at the Charbonneau Ranch the previous autumn by the eastern Canadian party. Men and equipment were moved by train and boat over

the Canadian Pacific lines of transportation to Creston, British Columbia, and thence, using their own horses, by trail to Porthill, Idaho, to begin work on the eastern end of the section of the boundary assigned to them.

At Porthill a preliminary datum from which to expand triangulation and line projection was established by measuring a broken base nearly 2 miles in length along the railroad track in the vicinity of boundary cairn 140 (now Monument 207). The straight line connecting the intervisible ends of the base was computed and its azimuth carefully determined by astronomic observations. Boundary cairns 139 (now Monument 206) and 140 (now Monument 207) were trigonometrically connected with the base and the azimuth and distance between them computed.

As the work progressed it became necessary to cross the Kootenai and penetrate the high and heavily timbered mountain country west of the river. The Kootenai was in spring flood from the melting snow in the mountains and spread across its low and swampy bottom lands to a width of more than 3 miles. Difficult crossings of the river were made by means of rowboats and scows. A wagon road which had been built by mining interests from Porthill up Boundary Creek crossed and recrossed the boundary for some 15 miles and then led up Blue Joe Creek to the Continental Mine. It had been expected that this road could be made use of by the party, but high water of the season before had carried out all the bridges and made much of the road impassable. Old pack trails had to be reopened and new ones cut and in many places graded. As the party progressed farther west, trail building had to be continued in advance of its movements during the entire season.

After crossing the Kootenai, the party took up the work of projecting the line westward from boundary cairn 139 (now Monument 206) to cairn 138 (now Monument 193) at the crossing of the South Fork of Salmon River. The unsurveyed distance between these marks was about 25 miles over very mountainous and heavily wooded country. It was decided to connect the marks by triangulation and to then compute the azimuth and distance between them. The necessary triangulation was carried forward from the base previously measured at Porthill, and upon its completion the computed chord between the two monuments was run from each end simultaneously to a meeting point on the high summit of Big Snowy Mountain. So carefully had this work been done that the discrepancy at the place of meeting was but 0.559 meter. Corrections were computed from the observed discrepancy for the transit stations and so applied as to give the true location of the boundary line.

After the true line had been determined, vista cutting was begun and carried on as other work and the weather permitted.

A phototopographic survey controlled by the triangulation was carried on during the progress of the work.

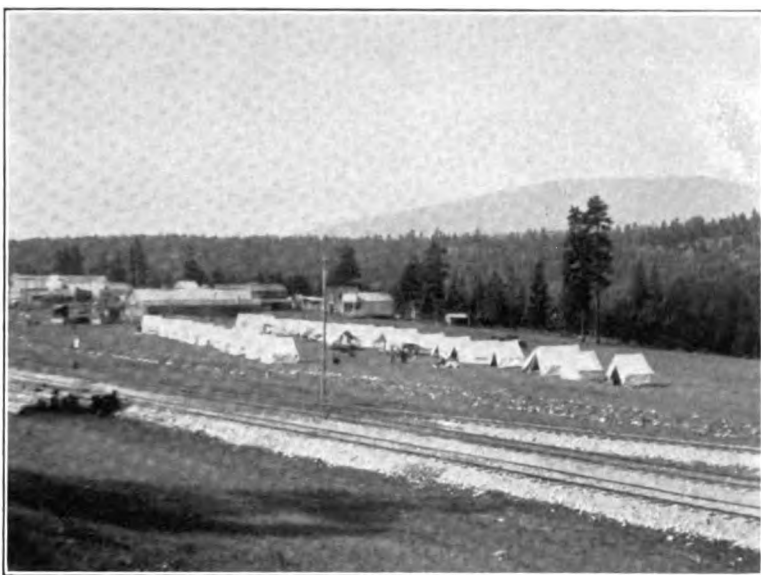
The operations of the party were very much hindered throughout the season by inclement weather. Out of 110 days in the field there were 46 days of rain or snow. By the 21st of September weather conditions had become so unfavorable that operations were suspended for the season. The main party came out of the mountains by way of Porthill and Creston while an assistant with the packers took the horses westward over the high summit through deep snow back to the Charbonneau Ranch on the Pend-d'Oreille (Clark Fork) River for winter quarters.

The personnel of the Canadian party was: Chief of party, W. F. O'Hara, D. L. S.; assistants, J. M. Bates, E. T. de Coeli, T. A. Davies, W. M. Tobey, J. M. Sheppard; naturalist, J. M. Macoun; assistant naturalist, Wm. Spreadborough; geologist, R. A. Daly; and 14 hands.

#### UNITED STATES PARTIES

The two United States parties in 1903 were organized at Gateway, Montana, early in June. It had been planned that there should be two major United States parties in the field, one under the direction of a chief of party whose designation was Chief Astronomer, the other under the direction of a Chief Topographer. While each of these parties was engaged much of the time in the retracement of the boundary, cutting vista, and in doing other than astronomic or topographic work, for the

sake of identity they were known as the astronomic party and the topographic party.



ORGANIZATION CAMP OF THE BOUNDARY SURVEY AT GATEWAY, MONTANA, 1903

The magnitude of the undertaking made it plain to the chiefs of party that field work would have to be carried on for several seasons by large organizations, and therefore it would be advantageous to equip the parties at the outset in a permanent manner. Accordingly, horses and saddles, instruments, tools, tents, and other camp requirements were all purchased outright.

The plans for the season provided for a total working force of about 80 hands and an equal number of horses. The purchase and shipment to Gateway of the necessary equipment for this organization was attended to by the chiefs of party and their assistants. The horses were bought locally. Many of the horses were fresh from the range and had to be broken to be ridden and to pack. The gathering together of equipment, employment of hands, setting up of camp, breaking, branding, and shoeing of horses, etc., fully occupied the first two weeks in June. The organization when completed was divided into the two main parties and they in turn into subparties for the various kinds of work on assigned sections of the line.

#### ASTRONOMIC PARTY

The United States astronomic party in 1903 was divided at the beginning of the season into three subparties, each directed by an assistant, and all three under the supervision of the chief astronomer. The first subparty was assigned to triangulation and geodesy, the second to vista cutting, and the third to trail building, line projection, and vista cutting.

*FIRST ASTRONOMIC SUBPARTY*

The first and second astronomic subparties left Gateway on June 23 and moved east to Phillipps Creek Pass to take up work on the 13-mile chord between boundary cairn 154 (now Monument 247) on Phillipps Creek and boundary cairn 155 (now Monument 254) on Wigwam River.

This section of the boundary had been surveyed and temporarily marked, on the curve of the parallel between the two boundary cairns, in 1901, through an error in judgment as to the force of the agreement of the Commission of 1857-69 that the boundary line between consecutive monuments irrespective of distance should be the chord or straight line. It was necessary, therefore, now to cut out and mark this line on the chord to conform to the original agreement. The first subparty proceeded to lay out the line on the chord, leaving it to the second subparty to take up the clearing of the vista.

After having established the chord, the first subparty took up the work of triangulation along the boundary. As they were already in the mountains east of Gateway, they began the selection of stations and building of signals east of Wigwam River and worked westward to Phillipps Creek. The party's attention was then turned to the selection of a site for and the measurement of a base. A tangent on the Great Northern Railway track just south of Gateway was selected and a base 1,226 meters in length was measured on July 30 by standard methods. The base was expanded to the stations of the triangulation scheme. Operations were then transferred to the boundary west of the Kootenai River.

The Purcell Range west of the Kootenai is so heavily timbered that travel is almost impossible without trails. The mountains, timbered to their tops, have to be cleared or lines of sight opened before they can be used as triangulation stations. Under such conditions, progress was exceedingly slow through this region.

Reconnaissance and observing of triangulation were carried westward nearly to Porthill, Idaho, at the western crossing of the Kootenai River. A little to the east of Porthill the United States Geological Survey stations "Ewing" and "Hell Roaring" were incorporated into the scheme for the purpose of making a connection with the geodetic datum of the "Spokane base."

About the end of October the party returned east and attempted to establish an additional station about 10 miles northwest of Gateway, in order to strengthen the triangulation scheme by making better conditioned triangles.

The station was selected and named "Kootenai", but before it could be cleared and made ready for observing, a snowstorm began and continued so long that further work for the season had to be abandoned. The party returned to Gateway where it was disbanded on November 20.

*SECOND ASTRONOMIC SUBPARTY*

The second astronomic subparty left Gateway in company with the first astronomic subparty on June 23 and moved to Phillipps Creek Pass in the vicinity of the boundary. The first astronomic subparty established the chord between the Phillipps Creek boundary cairn, No. 154 (now Monument 247), and the Wigwam

cairn, No. 155 (now Monument 254), as just related in the record of their operations. While that work had been going on, the second subparty had assisted the first subparty. Upon its completion, the second subparty started opening a 20-foot sky-line vista along the chord.

Along this 13-mile chord, the country is heavily timbered. In order to keep the party within working distance of the boundary and keep it supplied by the pack train it was necessary to build about 18 miles of main and side trails. Trail building and vista cutting each entailed much heavy labor and kept the party busy until the 5th of September. A stadia line had been run over this section of the boundary in 1901 and, while it had been run on the curve of the parallel between the two original monuments as laid out at that time, it was found to be practicable to transfer distances and elevations from it to the line now established on the chord.

The vista cutting having been finished on this chord, the party moved west across the Kootenai to the Yaak River over trails cut earlier in the season by the third astronomic subparty. Here lay the 24-mile chord between boundary cairn 146 (now Monument 231) on the west side of the Yaak River and boundary cairns 144 and 145 (now Monuments 217 and 218) which were approximately 100 feet apart on the east bank of the Moyie River.

The chief astronomer joined the camp here and personally supervised the work of projecting the chord between the two original boundary cairns. In the meantime one of the topographic subparties began the projection of the chord from the west end at the Moyie River. The two parties met with their lines on one of the high intervening summits. The necessary corrections were then made to the trial line to establish the true chord.

When the direction of the true chord had been determined, the second astronomic subparty began clearing the vista and running a stadia traverse over it. Work was continued until stopped during the first week in November by snowstorms which continued from day to day until by November 18, the snow was more than 2 feet deep. The party then moved out to Yahk Siding on the Canadian Pacific Railway and thence went by train to Gateway, where it was disbanded on November 21.

#### THIRD ASTRONOMIC SUBPARTY

The third astronomic subparty crossed the Kootenai River at Gateway, Montana, on June 24 and 25 to open a trial line across the intervening summits for the 17 miles between boundary cairn 151 (now Monument 241) on the west side of the Kootenai River and boundary cairn 149 (now Monument 234) on the east side of the Yaak River. The spring freshets from the melting snow of the mountains were extremely high this year. The Kootenai is a large stream and was not only at flood stage but its waters were carrying an unusual amount of driftwood, logs, and whole trees torn from the banks of the river and of its swift-flowing tributaries. There was no bridge across the river and no ferryboat at this time, though later in the season a ferryboat was put on, much to the convenience of the survey. The crossing of the party with its supplies and outfit had to be undertaken with rowboats. It was necessary to swim the horses led behind the boats. The whole operation of crossing was

extremely dangerous, and in spite of every precaution, two of the horses were drowned.

As soon as the exciting work of crossing the Kootenai and establishing a camp had been completed, the trial line at boundary cairn 151<sup>11</sup> (now Monument 241) was started. The chief astronomer observed on Polaris for an azimuth on the nights of June 28 and 29. From the determined azimuth he started the trial line to the west in the theoretical direction of the chord. The assistant in charge of the party then took over the work and continued the line from summit to summit to its terminus at boundary cairn 149 (now Monument 234).

The country across which this chord passes is extremely rough and is covered with a forest growth of great size and density. Trails ahead of the party had to be laboriously built as the trial line progressed westward.

Upon the completion of the trial line, the proper corrections were laid off on the intervening summits to mark the true chord. The clearing of the vista and the running of a stadia traverse along the chord was then begun and was continued to completion, in the latter part of October.

The party returned to Gateway on November 2 and proceeded from there over the Canadian Pacific Railway to Yahk Siding. From the latter place it moved by pack train to the boundary line on the East Fork of Hawkins Creek and began cutting vista on the chord between the Yaak and Moyie Rivers, between the second astronomic subparty and a topographic subparty already engaged along this chord.

The party had scarcely begun work and had cut but three-fourths mile of vista and about 1 mile of trail when the early and deep snow of the season compelled it to cease operations. After waiting for several days in the hope that weather conditions might improve, the party moved out to Yahk Siding, where the hands were paid off and the camp outfit and pack train shipped to Gateway, Montana.

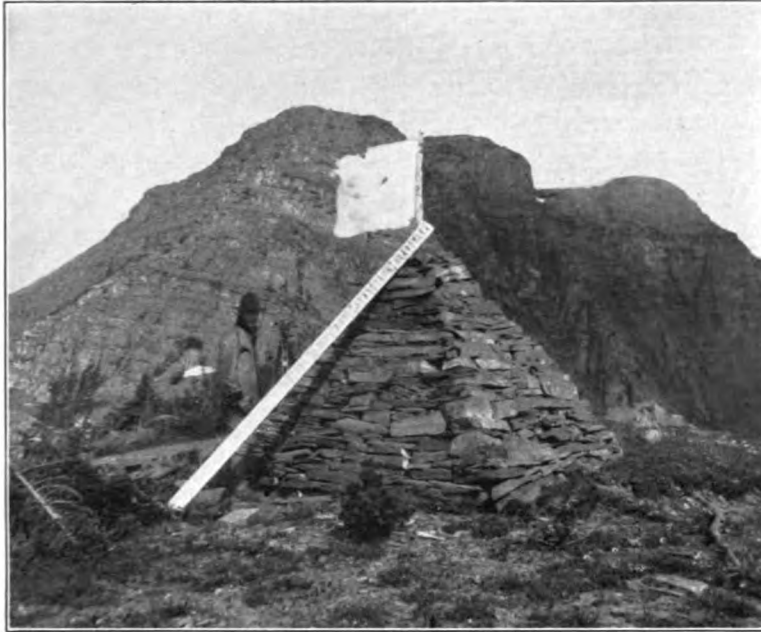
The personnel of the United States astronomic party was: Chief of party, C. H. Sinclair, Chief Astronomer; assistant in charge of first subparty, John Nelson; assistants in charge of second subparty, Reinert Hanssen, first half of season, and F. A. Camp, second half of season; assistant in charge of third subparty, E. R. Martin; and about 40 hands divided among the subparties as required.

#### TOPOGRAPHIC PARTY

The United States topographic party in 1903 was divided at the beginning of the season into four subparties, each directed by an assistant and all four under the supervision of the chief topographer. The first and second subparties were assigned to the retracement of the boundary, vista cutting, and topographic surveys. The third subparty was employed throughout the season on topographic surveys, and the fourth subparty in running levels.

The first topographic subparty was assigned at the beginning of the season to the section of the boundary between the Flathead River and the summit of the Rocky Mountains. The second subparty was directed to take up work between

<sup>11</sup> Boundary cairn 150 was never found and the conclusion was reached that it had never been built.



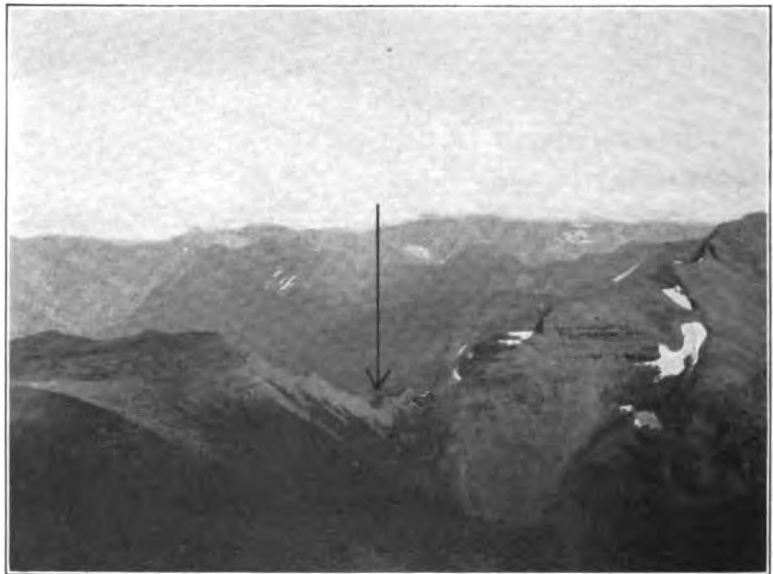
ORIGINAL BOUNDARY CAIRN 161 ON THE SUMMIT OF THE ROCKY MOUNTAINS, NOW REPLACED BY MONUMENT 272. CAIRN ERECTED IN 1861. PHOTOGRAPHED IN 1903

the Wigwam and Flathead Rivers. These two parties, consisting jointly of 20 men with 28 pack horses, left Gateway together on June 17 over the Grave Creek trail for the Flathead Valley. They were the first of the season to travel the trail and encountered many difficulties. The trail was blocked by many windfalls which had to be removed by axmen traveling in advance of the pack train. On the summit of the Galton Range, several miles of snow fields were encountered over which a route had to be picked where the

snow was solid enough to bear the weight of the horses. Heavy rain fell continuously on the day the high summit of the range was crossed. These difficulties and hazards were overcome only by dint of hard work and perseverance. The parties reached the Flathead Valley at the end of the fourth day and went into camp on the west bank of the river about 8 miles below the boundary crossing. Here the parties separated to take up their assigned work.

#### *FIRST TOPOGRAPHIC SUBPARTY*

At the outset the first topographic subparty was confronted with the necessity of crossing the swollen waters of the Flathead. In anticipation of high water, the chief topographer had sent three men up the river from Belton, Montana, with lumber and tools to build a small rowboat and with instructions to await the arrival of the parties at the trail crossing. The men and the boat were found waiting as expected. A raft was constructed of dry logs and loaded with equipment and supplies and then hauled across by a rope passed across the river by boat.



THE SUMMIT OF THE ROCKY MOUNTAINS. THE ARROW POINTS TO BOUNDARY MONUMENT 272 IN THE SADDLE IN THE FOREGROUND



After several attempts to force the horses into the stream had failed, they were led upstream to a high bank where they could be shoved over the bank into deep water and compelled to swim. The bell mare, with a rope from across the river attached to her halter, was first shoved over the bank and dragged to a safe landing place on the opposite shore. Guided by her whinnying and the sound of the bell, the other animals swam to her as they were in turn shoved into the water.

In this manner the crossing was effected in safety.

To meet the needs of both parties, a supply depot was established on the east side of the river and a man placed in charge. A combined pack- and wagon-train line of transportation from Belton, Montana, kept the depot stocked.

Before taking up their separate activities, the chiefs of the two subparties measured with a steel tape a preliminary base in the valley, from which to start

topographic work in the absence of more suitable control. A preliminary azimuth of the base was determined by solar observations.

The first subparty began line work on the chord between boundary cairn 159 (now Monument 265) on the west side of Kishenehn Creek and boundary cairn 158 (now Monument 262) on the east side of the Flathead River. As soon as this chord had been located, vista cutting and stadia traverse along it were begun by the transitman of the party.



A DIFFICULT CLIMB TO "KINTLA" TRIANGULATION STATION, ROCKY MOUNTAINS. COMMISSIONER RIGGS AS A YOUNG SURVEYOR IN 1903



CLIMBING TO A TRIANGULATION STATION IN THE ROCKY MOUNTAINS



The engineer in charge then took up the work of projecting the true line or chord between boundary cairn 160 (now Monument 266) on the east bank of Kishenehn Creek and boundary cairn 161 (now Monument 272) on the summit of the Rocky Mountains. This proved to be a difficult undertaking as the line passes along the almost perpendicular slope near the top of the highest peak of the Sawtooth or Boundary Mountains. This particular peak is approximately 9,400 feet in elevation and is 5,300 feet above the monument on Kishenehn Creek. In order to reach the point where the boundary crosses, the men had to work their way over snow slides and up the faces of cliffs where a slip or a misstep would precipitate them hundreds of feet down almost perpendicular mountain walls. Several attempts were made to scale the mountain before a signal was successfully placed on line.

When boundary location work had been completed, the engineer in charge took up triangulation, for topographic control, and the boundary mapping. In charge of the transitman, vista cutting and stadia traverse were carried on along the timbered portions. The stadia traverse had to be abandoned on the steep slopes of the Boundary Mountains, as the inclinations were so great that much of the line was inaccessible. All work on the section of boundary between the Flathead River and the summit of the Rocky Mountains was completed on August 18.

The first subparty then moved back over the Grave Creek trail to Gateway. On August 24 the party left Gateway by railroad with a carload of horses, outfit, and a month's supplies, for Goatfell, British Columbia. The stock car was delayed on the way by a washout on the railway and did not arrive at Goatfell until September 1. The party immediately moved 12 miles to the boundary line near boundary cairn 141 (now Monument 213) on the Moyie trail. After cutting a vista to the east to the summit of Border Mountain, it was discovered that boundary cairn 141 was only approximately on the parallel,<sup>12</sup> and pending the settlement of the question as to whether the boundary cairn should be accepted as a point on the boundary, the vista cutting at this place was discontinued.

The party then projected a 40-mile continuous random line through triangulation station "Border", which was conveniently located about 80 meters north of the boundary, between boundary cairn 140 (now Monument 207), on the east side of the Kootenai River at Porthill, and boundary cairn 146 (now Monument 231), on the west side of the Yaak River; and by the method of offsets from the random line established the true chords between the consecutive boundary cairns. Vista cutting was resumed by the transitman of the party in the vicinity of Mission Creek, and the vista-cutting crew of the second topographic subparty was put to work on the east side of the Moyie River.

After completing the retracement of the boundary from Porthill to the Yaak River, the chief of the subparty turned his attention to topographic mapping between the Yaak River and Hawkins Creek to the west. He completed the topography about November 1. For the few remaining days of the season he directed the vista-cutting crews.

<sup>12</sup> This monument had been located by the original Commission by running a traverse from the Moyie River station around the north base of Border Mountain, a distance of 5 or 6 miles, and a small error in latitude resulted from the accumulated errors of the traverse.

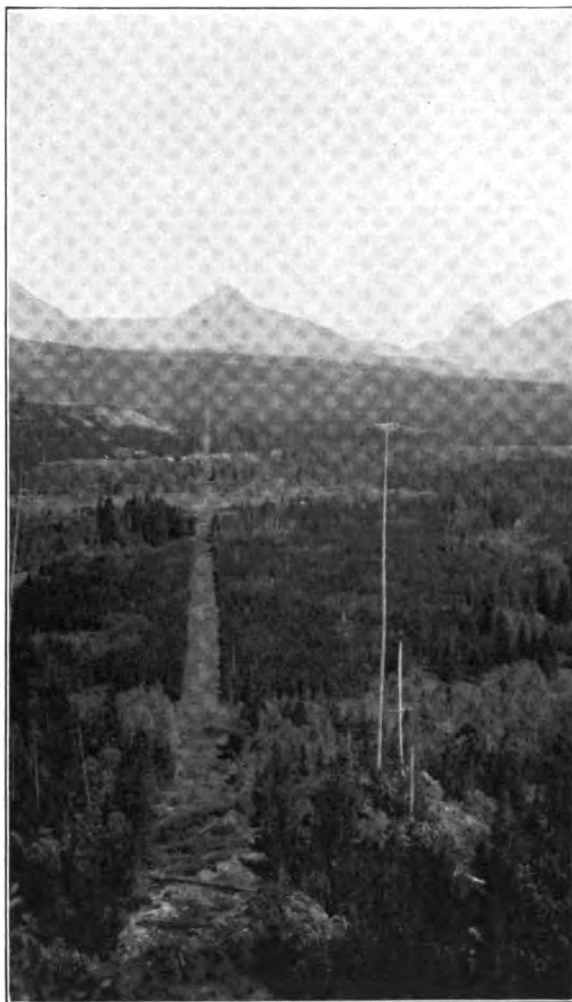
On November 6 snow began to fall and continued for several days, covering the ground to a depth of more than a foot in the valleys and to a greater depth on the mountains. The weather turned cold, the temperature dropping to 15° below zero, Fahrenheit. But little progress could be made under these conditions and the party disbanded on November 14.

#### SECOND TOPOGRAPHIC SUBPARTY

The second topographic subparty separated from the first topographic subparty at the trail crossing of the Flathead River late in June. A trail was built for 8 miles up the west side of the river and camp moved over it to the boundary near boundary cairn 157 (now Monument 261). From the Flathead River to the Wigwam River, the boundary passes over a summit 4,000 feet above the valley. The country was densely wooded and without trails. The transitman with a crew of axmen immediately began opening a trail to serve the needs of the party as it worked westward. The engineer in charge projected and established the true line or chord between boundary cairn 157 (now Monument 261) and boundary cairn 156 (now Monument 255.)

As soon as the boundary line was located, vista cutting and the running of a stadia traverse along it were begun by the transitman, while the engineer in charge began the topographic mapping and triangulation. All of these operations were continued, without special incident, to completion at the Wigwam River on September 14.

Upon completion of work on this section of the boundary, the party moved by trail to Gateway. From Gateway the party moved westward to Yahk Siding, British Columbia, by train and thence to the boundary. The axmen were transferred to a new vista-cutting party to work east of the Moyie River under the supervision of the first topographic subparty. The engineer in charge of the second topographic subparty with a small crew took up topographic work extending from about 10 miles east of the Moyie River westward to Porthill where, in conjunction with the third topographic subparty, he closed up the last gap in the mapping from



THE BOUNDARY VISTA, LOOKING EAST ACROSS THE FLATHEAD RIVER VALLEY

the summit of the Rocky Mountains to the west crossing of the Kootenai River. After finishing the mapping, he organized a vista-cutting party near Porthill. It then being November 1, little was accomplished before early snows and cold weather forced the party to suspend operations for the season, on November 15.

#### *THIRD TOPOGRAPHIC SUBPARTY*

To the third topographic subparty was assigned the topographic mapping along the sections of boundary retraced by the astronomic subparties, and work was begun at Gateway. The section of the boundary between the Kootenai River at Gateway and the Wigwam River had been mapped by the United States reconnaissance party of 1901. As this work was accepted after a small amount of checking and revision, practically all of the work of the third topographic subparty lay west of the Kootenai River.

The party measured a preliminary base at Gateway and expanded from it instrumentally to suitable points available for plane-table control until the astronomic party would be able to furnish final control data. The plane table, supplemented by stadia traverse, was then used for the actual mapping.

The topography immediately west of Gateway consists, for about 4 miles, of low, rolling hills covered with a dense growth of timber. Continuing westward, these timbered hills rise gradually in height for about 6 miles and then abruptly rise to the crest of the Purcell Range. This region had to be mapped almost entirely by stadia traverse for which many miles of line had to be cut through the underbrush, making the work slow and tedious. West of the Purcell summit the character of the country is more bold, and though mostly timbered was more easily mapped. In all of this heavily timbered country all work had to be done on foot. No horses were kept for party use. Camp was moved and supplies were brought in by the pack trains of the astronomic party working in the same area.

Topographic mapping was carried on as far west as the Yaak River where a junction was made with the work of the first topographic subparty, on October 21. The party then moved to Porthill, Idaho, and assisted the second topographic subparty in completing the mapping of the section of the line assigned to the United States parties in 1903. Having completed its mission, the party was disbanded on November 4.

#### *FOURTH TOPOGRAPHIC SUBPARTY—LEVELING*

The fourth topographic subparty or level party left Gateway on June 15, going by rail to Belton, Montana. There they spent a few days assisting the chief topographer in hiring and organizing transportation to supply the parties about to begin work on the Flathead River. This attended to, the party took up the operations to which it had been assigned.

Beginning at a United States Geological Survey bench mark at Round Prairie on the Flathead River, at the end of an unchecked line from Belton, the party ran a level line to the boundary on the Flathead River, ran spur lines to Kintla, Bowman, Quartz, and Logging Lakes, and checked the line back to a checked bench mark of the United States Geological Survey at Belton. The spur lines, except the one to

Kintla Lake, were run for the use of the United States Geological Survey, and reimbursement for the work was made by that Survey. Permanent and temporary bench marks were set along the line and at its terminus. While at work in the Flathead Valley, the party lived in camp and was transported by a hired pack train.

The level work in the Flathead Valley having been completed, the party moved to Rexford, Montana, and ran a checked line of levels from there to Gateway, Montana. The datum for this line was a Great Northern Railway bench mark established by a checked line of railroad levels from Columbia Falls, Montana, and referred to the United States Geological Survey datum at that place. While so occupied the party lived at hotels and ranch houses.

The level party completed its work on the 25th of October and was transferred to the chief astronomer. A trip was made to the Flathead River for magnetic observations on the boundary at that place. The return trip to Gateway had to be hastened to keep from being blockaded in the mountain ranges by the snow which began to fall early in November. Upon reaching Gateway, observations were made at two stations nearby. By this time the snow had become so deep that it was useless to attempt further work and the party was disbanded on November 20.

The personnel of the United States topographic party was: Chief of party, E. C. Barnard, Chief Topographer; assistant in charge of first subparty, D. L. Reaburn; assistant in charge of second subparty, J. G. Hefty; assistant in charge of third subparty, Sewell Truax; assistant in charge of fourth subparty, A. E. Franklin; transitmen, C. A. Holden, E. H. Loder, H. F. Burkhart; and about 40 hands.

#### SEASON OF 1904—SKAGIT RIVER TO THE SUMMIT OF THE ROCKY MOUNTAINS

The field operations of 1904 were a continuation of the work of the previous season. The number and organization of the field parties differed but little, the Canadians employing one main party and the United States two main parties as during the previous season. The Canadian party, however, was considerably augmented in size. The Canadian party continued work on the section of the boundary from the Kettle River near Laurier, Washington, and Cascade, British Columbia, to the crossing of the Kootenai River at Porthill, Idaho. The United States parties continued work on the section of the line from the crossing of the Kootenai River at Porthill, Idaho, to the summit of the Rocky Mountains; carried on triangulation and other work between the Similkameen River and the most eastern crossing of the Kettle River near Laurier, Washington; and did the major part of the field work on the section of line, assigned to United States parties, between the Skagit and Similkameen Rivers.

#### CANADIAN PARTY

The Canadian party of 1904 was organized at Porthill, Idaho, during the first week in May. It consisted of 34 men and was provided with 33 head of pack horses. Twenty-one of the pack horses were purchased locally at the time of organization and were immediately available. The remainder of the horses had been used the

previous season and wintered at the Charbonneau Ranch on the Pend-d'Oreille (Clark Fork) River. These were brought across the mountains as soon as the melting snows permitted and arrived at Porthill about June 1. At the time of organization the Kootenai River was in its annual spring flood and the crossing of the river with outfit and supplies to reach the west side presented the usual difficulties. The animals were made to swim and wade the three miles across the flooded valley while outfit and supplies were ferried across in small boats. For efficiency, the party was divided into two general divisions, one for triangulation and the other for line projection, vista cutting, trail building, and phototopography. Each of these main divisions was divided from time to time into smaller crews.

The triangulation party was made up of two self-dependent units, one for reconnaissance and signal building and one for observing. Triangulation was begun at stations "Hell Roaring" and "Hawkins" of the United States party and carried westward through stations on each side of the boundary.

The difficulties of travel through the high and heavily timbered mountains, the rains and bad weather of the early part of the season, and smoke from forest fires in the latter part of the season combined to make the progress of the triangulation very slow. Weather conditions became so unfavorable about the middle of October that the triangulation was suspended for the season before a junction, as planned, could be made with the work of the United States parties at stations "Buck" and "Horn" near the eastern crossing of the Kettle River.

After the suspension of triangulation, the party spent some time before disbanding in measuring the deflection angles of the boundary at the original cairns or monuments between the Columbia River and the most eastern crossing of the Kettle River.

The line-work division of the party began operations with a vista-cutting crew of 16 axmen on May 12 at original boundary cairn 139 (now Monument 206). This crew worked west along the 25-mile chord which had been established the previous season and upon which the vista had been cut only on two short sections.

As the vista cutting proceeded westward twelve intermediate monument sites were selected and marked, and horse trails were cut, over which monuments and material for their bases might be transported from the main trail. The work on this chord was completed on July 10. Three days later the short line, 0.7 mile, between original cairns 137 and 138 (now Monuments 192 and 193) had been cleared and a start made on the 9-mile chord to original cairn 136 (now Monument 188) at Pend-d'Oreille (Clark Fork) River. In order to keep near the work it was necessary to cut a trail along the boundary from the South Fork of the Salmon River to the Pend-d'Oreille. Trail cutting was slow work, the timber being thick and the windfalls heavy. Trail cutting, line projection, vista cutting, and selection and marking of monument sites on this chord were completed on August 10.

This brought the party to the crossing of the Pend-d'Oreille. The stream was too large and swift to ford and the only bridge available was the Great Northern Railway bridge at Waneta, British Columbia. The party moved down the river by trail and road to Waneta, crossed the horses over the railroad bridge by placing relays of plank on the ties ahead of them, and then moved up Cedar Creek over a

wagon road to the Fish Creek Gold Mine, which is about a mile south of the boundary and about 4 miles west of the crossing of the Pend-d'Oreille from which they had started. The party had traveled over 30 miles on this move in order to cross the river and advance a distance of but 4 miles.

From the Fish Creek Mine a trail was cut and camp moved to a point on the boundary about 2 miles west of original boundary cairn 134 (now Monument 186). Work on the 12-mile chord between the Pend-d'Oreille and Columbia Rivers was begun from this camp and carried on until completed on October 8. The chord crosses numerous high ridges and deep, heavily wooded ravines, which seriously retarded line projection and vista cutting along it.

Upon reaching the Columbia River, the party moved to Northport, Washington, where they were able to cross the Columbia on the railroad bridge by loading their horses and outfit into box cars and having the cars shunted across the bridge. Having crossed the river, the party moved by trail up the valley of Little Sheep Creek to Paterson Station on the Great Northern Railway, just north of the boundary. From there they worked westward.

In the meantime a small crew, under the direction of the topographic assistant, had been put to work, on August 25, on the interval of the boundary between the Columbia River and Paterson Station on Little Sheep Creek.

This part of the boundary had been retraced by the Canadian reconnaissance party in 1902. Phototopographic surveys had been made and much of the vista had been cut at that time. The crew now completed the vista, made line measurements, located intermediate monument sites, and made some needed additional phototopographic surveys. The work was completed early in September.

The topographic assistant then reduced the size of his crew by a half dozen axmen and returned to Waneta to complete the phototopographic surveys along the Pend-d'Oreille (Clark Fork) and Columbia Rivers.

Returning now to the account of the main line-work party at Paterson on Little Sheep Creek: the party worked westward along the boundary, widening the vista where it had been cut in 1902, opening it in valleys where it had not been cut, and locating and marking intermediate monument sites. The party completed this work to the most eastern crossing of the Kettle River on November 9.

By this time all the other units or crews had been disbanded. However, as the weather was still fine it was decided to continue work, and camp was moved to Midway, British Columbia. Here the widening of the vista of 1902 was begun to the westward from original boundary cairn 96 (now Monument 141). Operations had no more than been well started when the good weather broke, causing all work to be suspended for the season. The party was disbanded on November 13.

The personnel of the Canadian party was: Chief of party, J. J. McArthur, D. L. S.; assistant in charge of triangulation, Howell Bigger, D. L. S.; assistant in charge of line projection, Noel J. Ogilvie; assistant in charge of phototopography, T. A. Davies; other assistants, W. M. Tobey, J. N. Sheppard, E. T. de Coeli; and 27 hands.

## UNITED STATES PARTIES

The United States forces engaged in field work in 1904 were, as in the previous season, divided into two main parties, one under the direction of the chief astronomer, called for convenience the astronomic party, the other, under the direction of the chief topographer, known as the topographic party. Each of these parties was in turn divided into subparties.

## ASTRONOMIC PARTY

The United States astronomic party in 1904 undertook the work of completing the vista cutting and stadia surveys along the boundary in the vicinity of the Yaak River where work had been interrupted by the advent of winter the previous season; the locating and marking of the sites for intermediate monuments and the completion of the triangulation from the crossing of the Kootenai at Porthill to the summit of the Rocky Mountains; the execution of a belt of triangulation along the boundary from the most eastern crossing of the Kettle River westward to the crossing of the Similkameen River; and the setting of monuments.

In order to carry out these plans for work so widely separated as to character and locality, the party was divided into three subparties. The first subparty was to undertake the triangulation from the eastern crossing of the Kettle River to the crossing of the Similkameen River. The second subparty was assigned to locating and marking the intermediate monument sites and completing the triangulation on the line from the crossing of the Kootenai at Porthill, Idaho, to the summit of the Rocky Mountains, and to take part in the completion of the vista cutting and stadia traverse on the same section of the boundary. The third subparty was expected to cut vista, run stadia traverse, assist the other parties, and set monuments.

## FIRST ASTRONOMIC SUBPARTY

The first astronomic subparty was organized at Kalispell, Montana, early in May. The entire party, outfit and pack horses included, were shipped over the Great Northern Railway to Laurier, Washington, arriving on May 16. Triangulation was commenced by establishing two stations, "Buck" and "Horn", about 6 miles east of the eastern crossing of the Kettle River. From here a reconnaissance was carried westward and stations were selected through which to develop a scheme of triangulation along the boundary to the Similkameen River. The reconnaissance included the location of a base to be measured on the Great Northern Railway near Danville, Washington.

This reconnaissance had scarcely been begun when the observer received an appointment on the Panama Canal and left the party. The assistant in charge of the third astronomic subparty was transferred from the vicinity of Gateway, Montana, to take his place. Work progressed so well that on August 9 the observer was transferred back to take charge of a vista-cutting party. On August 24 the reconnaissance was completed to the Similkameen River and a junction was made with the triangulation of the United States topographic party working westward.

The assistant in charge of the party which up to this time had been carrying on the reconnaissance now took over the observing and carried it on until September

17, by which time most of the work had been completed. Smoke from forest fires was unusually dense and had already retarded work to a great degree. It now became much more troublesome so that observations could not be made for days at a time. It was October 1 when the party had completed observing and reached Danville to measure the base which had been laid out nearby.

A day or two after reaching Danville the assistant in charge, Mr. John Nelson, was taken ill and was moved to a hospital in Grand Forks, British Columbia, where he died on October 5. He was buried at Grand Forks on October 8.

The chief astronomer measured the base and completed the triangulation on this section of the boundary a short time later.

Upon the death of Mr. Nelson, the party which had been under his direction was set at erecting monuments under the direction of the head packer. The first monument on this section of the boundary was set at Carson on October 10 under the personal supervision of the chief astronomer. The work was continued by the party until 16 monuments had been set between the most eastern crossing of the Kettle River and the summit of the mountain near the Paris Mine west of Danville. The material for most of these monuments, aggregating about one thousand pounds for each monument, was carried to the sites by pack horses. Some of the sites were extremely difficult to reach even with pack horses. In one instance a horse, loaded with sand, fell from a cliff bordering a difficult piece of trail and was killed.

Monument setting was completed on November 10 and the party disbanded.

#### SECOND ASTRONOMIC SUBPARTY

The second astronomic subparty was organized early in May at Gateway, Montana. Work was commenced on the chord between original boundary cairns 153 and 154 (now Monuments 245 and 247). This chord is just east of Gateway and passes over comparatively level and open country. On account of its accessibility and the ease with which it could be surveyed, work on it had been postponed the previous season in favor of more difficult tasks. The party now ran a stadia survey along the chord, cut out the vista, and located an intermediate monument site. They also located an intermediate monument site at the railroad crossing at Gateway, on the chord between boundary cairns 152 and 153 (now Monuments 243 and 245).

This work was completed May 23, whereupon the party moved to the west side of the Kootenai River and completed the stadia traverse between boundary cairn 151 (now Monument 241) and the Purcell summit. Next, triangulation station "Kootenai", where work had been suspended on account of snow in 1903, was cleared and the necessary observations made to incorporate it into the previously observed triangulation scheme. On June 13 the party moved eastward again and made a systematic test of the alinement of the monument sites on the chord between original boundary cairns 154 and 155 (now Monuments 247 and 254) and at the same time cut horse trails to the monument sites.

The party next moved west of the Yaak River and took up vista cutting and stadia surveys along the boundary where it had been interrupted by snowstorms the preceding year. The work was continued westward to a junction with the work of the United States topographic parties and was completed on July 20.



The party then trekked eastward once more to complete the triangulation scheme between the Wigwam River and the summit of the Rocky Mountains. Signals were rebuilt on the old stations and three new stations were selected to complete the scheme. This reconnaissance was completed early in August. Before observations could be commenced forest fires broke out and continued almost without intermission until November, blanketing the entire region with smoke and preventing trustworthy observations. The assistant's journal was a record of discouraging and futile efforts to make observations—climbing day after day to the peaks only to be baffled. A few light showers of rain fell but were insufficient to check the fires or clear the atmosphere. Later on there were snow flurries followed by fog in addition to the smoke. Violent windstorms occurred which overturned signals in several instances and prevented observations that could otherwise have been made. Everything seemed to combine to prevent the accomplishment of results. Near the middle of October the snowfall made the ascent of some of the peaks dangerous, their sides being almost sheer rock. Finally, during the latter part of October, pasturage for the pack horses was cut off by deep snow, and further attempts had to be abandoned.

When this happened, the party moved down the Flathead River and disbanded.

#### *THIRD ASTRONOMIC SUBPARTY*

The third astronomic subparty was organized at Gateway early in May. They crossed the Kootenai River and cut the vista, made a stadia survey, and located an intermediate monument site on the chord between original boundary cairns 151 and 152 (now Monuments 241 and 243). Similar work was then begun west of boundary cairn 151 (now Monument 241). This had hardly been started, however, when the party disbanded and the assistant in charge of the party was transferred to the west to act as observer for the first astronomic subparty. He continued to act in that capacity until August 9 and then organized a party at Laurier, Washington, and began cutting vista along the boundary west from Laurier. This work was continued until August 28. The party then moved eastward with its pack train of 8 horses to Gateway, Montana, for the purpose of setting monuments in that vicinity.

The first new monument on the 49th parallel boundary was set by this party on September 12 under the personal supervision of the chief astronomer. The monument now bears the number 242 and stands about  $2\frac{1}{2}$  miles west of Gateway.

There were 24 monuments available for setting at this time. These were set by the party between Frozen Lake on the east and the Yaak River on the west by October 19. The party was then disbanded at Gateway. The assistant in charge looked after the storing of property at Gateway and then returned to Danville, Washington, where he assisted the chief astronomer in completing the base measurements, observing azimuth, and completing the triangulation remaining to be done at the time of the death of the chief of the first subparty.

The personnel of the United States astronomic party was: Chief of party, C. H. Sinclair, Chief Astronomer; assistant in charge of first subparty, John Nelson; assistant in charge of second subparty, F. A. Camp; assistant in charge of third subparty, E. R. Martin; observer, A. M. Miller (for a short time only); and about 25 hands.

## TOPOGRAPHIC PARTY

The United States topographic party in 1904 undertook to complete its part of the unfinished vista cutting and preparation of the line for monumenting on the section of the line east of Porthill, Idaho, and to retrace the boundary, cut the vista, execute the triangulation, and make the topographic surveys on the section of line between the Skagit and Similkameen Rivers.

The first work of the season was done by an advance level party which started at Bonners Ferry, Idaho, about March 15 and ran a checked level line from there along the Great Northern Railway through Porthill to Creston, British Columbia. The length of this circuit was about 66 miles. Six permanent and thirty temporary bench marks were set on this line. The levels were completed about the middle of April.

The main party assembled and organized at Harvey's Ranch near Copeland, Idaho, about the middle of May. Vista-cutting crews were organized and started at Porthill, on Mission Creek, and in the vicinity of the Moyie River, where the parties had been forced by snowfall to quit work in 1903. A small party checked the alinement of the chords between original monuments and made connections between them and the triangulation. This work was all completed by June 10.

On June 11 the personnel with all camp equipment and pack horses were assembled at Copeland and shipped on the same day over the Great Northern Railway to Wenatchee, Washington. The expedition now consisted of the chief of party, 4 assistants, 25 hands, 27 horses, 20 mules borrowed from the United States Geological Survey at Wenatchee, the camp gear, instruments, and baggage.

From Wenatchee the entire outfit was shipped on river steamers of the Columbia and Okanogan Steamboat Company to Riverside, Washington, the head of navigation on the Okanogan River from where men and material were transported to Loomis, Washington, 35 miles distant, by hired wagons, while the loose animals were herded in by the packers.

A base camp at McDaniel's Ranch 2 miles from Loomis, near the beginning of the trail up Chopaka Mountain to the boundary, was occupied by June 16.

Three subparties were formed: the first for retracement and projection of the line; the second for triangulation; and the third for topography and vista cutting.

## LINE PROJECTION SUBPARTY

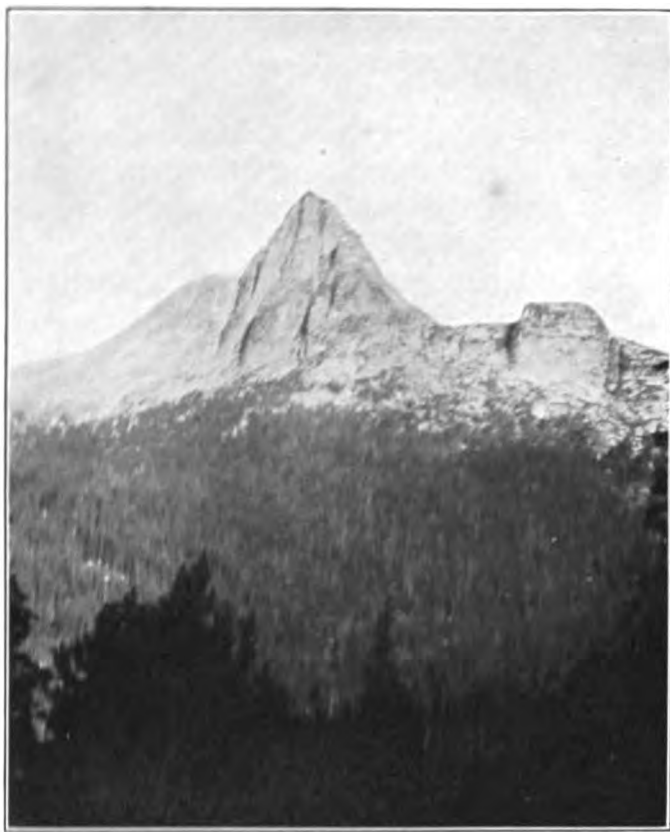
The line projection subparty began work at original boundary cairn 64 (now Monument 109) on the west side of the Similkameen River. From there a random line was run from summit to summit of the intervening ridges to boundary cairn 63 (now Monument 101), a distance of 12 miles. The corrections to the random line were computed, laid off, and marked on the ridges with sufficient accuracy to permit the vista crews to start slashing by the 27th of June.

The party then established the boundary westward across the unmarked interval of 23 miles to the Pasayten River. This was somewhat more difficult as there were no trails and the country was covered with a thick growth of timber filled with a tangle of underbrush and windfalls. The mules borrowed from the Geological

Survey were used in this advance work for the reason that mules will pick their way through trailless woods with an ease and freedom from fretting not usual with horses under like circumstances.

The party made the final location of the line to the Pasayten River on July 15 and, after a trip out for provisions, established the 24-mile chord between the Pasayten and Skagit Rivers, finishing during the first week in August.

Upon the conclusion of line projection, the assistant in charge organized an additional vista-cutting crew and at the same time took charge of the vista crews which up to this time had been under the topographic subparty. While super-



CATHEDRAL PEAK, A BALD GRANITE SUMMIT OF THE CASCADE MOUNTAINS, JUST SOUTH OF THE INTERNATIONAL BOUNDARY, USED AS A TRIANGULATION STATION

vising these crews, he made additional checks of the alinement of all the chords from the Skagit River to the Similkameen River.

The first vista-cutting crew completed its section of the boundary and moved out of the mountains on September 25, as did the other two crews on October 9. The assistant in charge completed the testing of the alinement of the chords and reached Loomis on October 8.

One of the vista-cutting crews was paid off, another was sent to the Similkameen crossing to cut vista up the side of Chopaka Mountain, and the third was sent to Danville, Washington, to cut vista eastward toward Laurier, Washington, to the point where the United States astronomic subparty had suspended work on August 28.

When the vista-cutting crew on the slope of Chopaka Mountain completed its work there, it was transferred to Midway, British Columbia, and placed on the vista between Midway and Danville which had been partially cut in 1901. While these operations were progressing the assistant in charge set the 9 monuments now numbered 141 to 149. The vista cutting by the two crews and the monument setting were completed November 2. The hands were paid off the next day. The assistant, foreman, and packers then assembled the scattered outfits for winter storage. The party was completely disbanded on November 7.

#### TRIANGULATION SUBPARTY

The triangulation subparty under the direction of the chief topographer was organized immediately after the arrival of the main party at Loomis, Washington.

It was made up of two self-dependent units, one for reconnaissance and signal building, and one for observing. Work commenced at the United States Geological Survey stations "Chopaka", "Lemanasky", and "Bonaparte" and was carried westward along the boundary to points west of the Skagit River. Work progressed satisfactorily until August 1 when smoke from forest fires began to interfere with the visibility. From August 10 to September 1 and from September 20 to September 30 the smoke was so heavy that it seriously interfered with topographic work and prevented observations altogether on triangulation. The reconnaissance was completed September 10 and the foreman in charge was transferred to a vista-cutting crew. The triangulation observations were completed on October 20 and the party disbanded at Loomis.

#### *TOPOGRAPHIC AND VISTA-CUTTING SUBPARTY*

The topographic and vista-cutting subparty, composed of about 40 men, left the base camp at McDaniel's Ranch over the Chopaka trail for the boundary on June 20. It required 40 pack horses to transport the equipment, and these, together with the men on foot, made an imposing procession as they climbed the mountain trail in single file. Having reached the nearest point to the boundary on this trail, the party went into camp and began cutting trails to the boundary so that the vista-cutting crews could camp conveniently near their work. On June 27 two vista-cutting crews of 16 men each had been placed in convenient spots and began cutting vista on the 12-mile chord established by the line projection party between boundary cairns 63 and 64 (now Monuments 101 and 109).

The assistant in charge now began the topographic mapping, combined with a reconnaissance for routes of travel. A few days later a gang of 4 men was put to work on building a trail over which to proceed westward. This gang was kept busy nearly all of the summer, and at times had to be reenforced by axmen from the other crews.

The topographic mapping, trail location and building, and vista cutting all proceeded in an orderly manner without interruption until the first of August, when forest fires became plentiful in the mountains. Smoke from the fires seriously interfered with the topographic work and the proximity of fire endangered the camps on several occasions to such an extent that lookouts had to be maintained to warn the men if the fire headed their way. On one occasion all hands had to fight fire all day to protect the camp.

About August 10 the assistant in charge of the line projection party, having completed the retracement and establishment of the boundary to the Skagit River, relieved the assistant in charge of the topographic party of the supervision of the vista-cutting crews so that he might devote all his time to topography and thus insure its completion before snow fell.

At about this time it became known that it was feasible to run a line of levels from a United States Geological Survey bench mark near Barron, Washington, across the ridge and down the Pasayten River to the boundary to give a check on the elevations carried by vertical angles from the Similkameen River. A party of 5 men was sent to Barron, August 13, to run this 30-mile line. The party succeeded

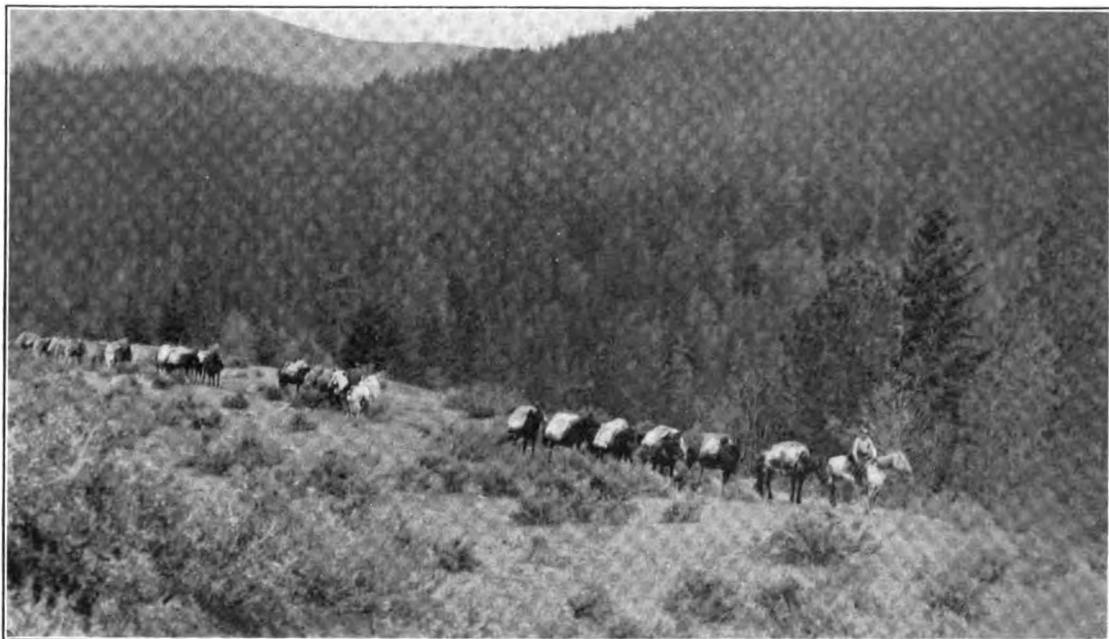
in reaching the boundary with the line but was unable to check back on account of snow that had begun to fall before the boundary was reached. They succeeded in getting out of the mountains before snow entirely blocked the trails, reaching Loomis on October 17.

Topography was completed to the Skagit River on September 25 and the party moved out over the old Fort Hope and Dewdney Trails to Princeton, British Columbia, arriving on the 27th. From Princeton the party continued on to the boundary crossing at the Similkameen River where it was engaged during the first half of October on nearby topographic work.

On October 15 the topographic subparty moved from the Similkameen to Danville, Washington, and from there did the mapping between Danville and Laurier, Washington. This piece of work required the greater part of a month. The party disbanded on November 14, the last of the parties to leave the field.

Transportation for the various subparties in the Cascade Mountains during the season of 1904 was a most important phase of the work. The number of men employed in the parties ranged from 60 to 70. An equal number of pack animals was required to move the camps and to keep them supplied with provisions. The only trails approaching the boundary from places which could be used as supply points were from Loomis, Washington, to the summit of Chopaka Mountain, and from Princeton, British Columbia, to the crossing of the Skagit River. These two points of approach were 60 miles apart, and the intervening country was entirely without trails.

The small triangulation and line parties were each furnished with their own saddle and pack animals, and as most of their movements were in advance of the larger crews, they were forced to make their way through the mountains, largely without trails. Mules were used, being adept in traveling over rocky country and



ON THE WAY WITH THE PACK TRAIN; IN THE CASCADE MOUNTAINS

through brush and windfalls. The large and slower moving vista-cutting crews were moved and supplied by a pack train of about 30 horses under the direction of a head packer operating from base supply camps established at suitable places.

Trails had to be opened for this pack train in order that it might work with maximum efficiency, so during the course of the season a continuous main trail was constructed along the boundary from Chopaka Mountain to the Skagit River. From this main trail many branch trails were cut in order to place camps at convenient locations on the boundary and to reach the selected monument sites. These trails, including the branches, totaled 120 miles.

The first approach to the boundary was over the Chopaka Mountain trail from the supply camp at McDaniel's Ranch near Loomis. After work had progressed some distance westward, it was found that a day's travel for the pack train could be saved by cutting a trail about 15 miles long up Toats Coulee to the boundary trail. This trail was cut by a special gang of 10 men, between July 5 and 24.

After opening up the Toats Coulee trail, the special crew was sent to Princeton, British Columbia, where they cleared out an old trail up the Similkameen River to the forks of the stream and from there built 15 miles of new trail up the Pasayten River to the boundary. This trail was completed about August 15, and the source of supplies was then changed from Loomis to Princeton, British Columbia. This not only shortened the distance for the pack trains, but provided a route of low elevation as an egress from the mountains should the parties get caught in an early snowfall.

The supplying of forage for the pack animals in the Similkameen-Skagit section was much simplified by the numerous open mountain parks covered with a luxuriant growth of nutritious grass which with a small ration of grain sufficed to keep the animals in good condition.



PACKING UP CAMP AT PARK PASS IN THE CASCADE MOUNTAINS

At the close of the season of 1904, the major part of the field work on the sections of the boundary west of the summit of the Rocky Mountains assigned to United States parties had been completed. The retracement and survey of the line, the vista cutting, the selection and location of new monument sites, and the topographic mapping were entirely finished. The triangulation still required a small amount of work to bring it to completion. Forty-nine new monuments had been set, and everything made ready for the setting of the remainder.

The personnel of the United States topographic party was: Chief of party, E. C. Barnard, Chief Topographer; assistant in charge of line projection work, D. L. Reaburn; assistant in charge of triangulation, Sledge Tatum; assistant in charge of topography, J. G. Hefty; transitmen, Thomas Riggs, Jr., J. P. Breckenridge, W. B. Reaburn, G. H. Wheeler; and from 40 to 65 hands.

#### SEASON OF 1905—DETACHED SECTIONS WEST OF THE SUMMIT OF THE ROCKY MOUNTAINS

Field operations were continued in 1905 by Canadian and United States parties in much the same manner as in previous seasons. The Canadian forces completed the work on the sections of the boundary assigned to them between the Kootenai River at Porthill, Idaho, and the most eastern crossing of the Kettle River, and from Midway, British Columbia, to the Similkameen River, and did a large amount of work on the section from the Skagit River to Point Roberts. The United States parties completed all work on the sections that had been assigned to them.

#### CANADIAN PARTIES

The Canadian forces in 1905 were divided into several small parties operating at times in widely separated places. At other times these small parties were assembled and combined into larger units.

#### LINE PARTY

During the last week in April a line party of 14 men was organized at Midway, British Columbia, for the purpose of clearing and widening the vista along the boundary between Midway and the Similkameen River which had been cut by the Canadian reconnaissance parties of 1901. While so engaged they made a topographic survey on each side of the boundary between Osoyoos Lake and the Similkameen River for the purpose of supplementing the phototopography done in 1901. The party completed these operations to the Similkameen River on June 20, whereupon it moved by pack train to Princeton, British Columbia, and thence by the old Dewdney Trail to the Skagit River and down that stream to the boundary crossing, which was reached July 6.

A trail-building party of 12 men, with a pack train of 15 horses, organized at Hope, British Columbia, on June 1, had preceded the line party to the Skagit River and was engaged in building a trail westward along the boundary toward Chilliwack Lake, when the line party arrived. Although this is a very difficult country, the trail builders had made good progress, making it possible for the line party to begin imme-



diately on the 9-mile chord from original boundary cairn 55 (now Monument 71) on the west side of the Skagit Valley to original boundary cairn 54 (now Monument 67) near the head of Depot Creek.

This chord passes over very rough country. It crosses five high ridges and three glaciers on the north shoulder of Glacier Peak, reaching an elevation of 7,700 feet. One of the high ridges crossed is so sharp and the rock so disintegrated that it was impossible to set up a transit without extensive preparation of the station.

Before the line could be laid down, smoke from forest fires seriously retarded the work. Vista cutting was slow on account of the heavy timber on the slopes and in the ravines. Under these adverse conditions it was September 12 before the party reached boundary cairn 54 and had even then not fully completed the vista cutting on the chord. An attempt to carry on phototopographic surveys together with the other work failed of accomplishment in the smoky atmosphere. In the meantime the trail-cutting crew had completed the trail from the Skagit River as far west as original boundary cairn 52 (now Monument 65) on Depot Creek.

As the weather had now become very wet and stormy, it seemed wise to leave the mountains for the season. The two parties withdrew by the way of the Skagit to Hope and thence down the Fraser Valley to Sumas Prairie, where they were merged for vista cutting. Beginning at Monument 41, the vista was recut to the westward in order that measurements might be made along the line. This vista had been first opened by the reconnaissance party in 1901, a fact now almost unbelievable in view of the height and density of the forest growth of the intervening four years.



GLACIER PEAK, CASCADE MOUNTAINS, A TRIANGULATION STATION 2 MILES SOUTH OF THE INTERNATIONAL BOUNDARY. VIEW FROM THE NORTHWEST



While vista cutting was progressing, two small topographic units of the party were employed in road traverse and other surveys from which to construct a topographic map. Vista cutting and topography were carried on until October 19 to a junction with like work of another party at Monument 21. The party was then disbanded for the season.

#### WESTERN TRAIL- AND VISTA-CUTTING PARTY

A small trail- and vista-cutting party was organized in July in the Columbia Valley in the western foothills of the Cascade Mountains. This party cut a trail from the Columbia Valley east along the line through the heavy timber and windfalls, for about 4 miles, to the summit of the first high ridge of the Cascade Mountains. They then cut the vista along the line from Monument 43 in the Columbia Valley to Monument 41 and eastward from Monument 43 to the foot of the mountains.

Following this the party moved by hired teams to Monument 21 between Sumas and Blaine, Washington, and began recutting vista along the line to the west. The party was reenforced about the middle of September by the monumenting party which had completed its work on the Similkameen-Midway section.

The combined party completed the opening of the vista from Monument 21 to Monument 5 on Semiahmoo Bay and replaced the original cast-iron pillars numbered 5 to 9 inclusive with aluminum-bronze monuments. They disbanded on October 19.

#### TOPOGRAPHIC PARTY

A party of 6 men with 6 horses was organized at Paterson, British Columbia, for the purpose of completing the topographic surveys where smoke had interfered during the previous season. This party completed the topographic surveys, including the traversing of the roads, from Little Sheep Creek to the eastern crossing of the Kettle River near Laurier, Washington, in the third week of July and then moved to Midway, British Columbia, where they arrived July 25.

At Midway the party began a double-rodged stadia survey from monument to monument from original boundary cairn 96 (now Monument 141) to original boundary cairn 64 (now Monument 109) on the Similkameen River. Work was completed September 11 and the hands of the party were paid off. The horses and outfit were turned over to the monumenting party working in the same vicinity. The engineer in charge of the topographic party and his assistant were sent to Blaine, Washington, to superintend the vista-cutting party between Monument 21 and Semiahmoo Bay for the rest of the season.

#### MONUMENTING PARTIES

There were two Canadian monumenting parties during the season. One, consisting of 6 men and 8 pack horses, was organized at Waneta, British Columbia, on May 15. This party set the 26 monuments between the Columbia and Kootenai Rivers by August 10, then returned to Waneta, crossed the Columbia River, and set the 14 monuments between the Columbia and Kettle Rivers, completing the work on October 1. The party then disbanded at Cascade, British Columbia.

The other monumenting party, consisting of 5 men and 5 horses, was organized at Midway, British Columbia, on May 10. This party replaced the original boundary cairns between Midway and the Similkameen River with aluminum-bronze monuments. They reached the Similkameen on September 11 at the same time the topographic party had completed its work and disbanded. They took over the outfit and pack train of the topographic party and moved the combined outfit over roads and trails by the way of Princeton and Hope, British Columbia, and thence down the Fraser Valley and across to Blaine, Washington, where the party was merged with the western trail- and vista-cutting party already described as working between Monument 21 and Semiahmoo Bay.

#### TRIANGULATION PARTY

A party of 5 men, provided with 8 horses, was organized at Waneta, British Columbia, on May 1 for the purpose of completing the triangulation scheme from the Kootenai River at Porthill, Idaho, to a junction with the work of the United States parties at stations "Buck" and "Horn", near the eastern crossing of the Kettle River. This party completed its work and disbanded on August 21.

The personnel of the Canadian parties was: Chief of party, J. J. McArthur, D. L. S.; assistant in charge of triangulation, Howell Bigger, D. L. S.; assistant in charge of line projection, Noel J. Ogilvie, D. L. S.; assistant in charge of topography, S. S. McDiarmid, D. L. S.; other assistants, J. M. Sheppard, E. T. de Coeli, Stanley Everall, J. W. McArthur; and from 40 to 50 hands.

#### UNITED STATES PARTIES

The United States forces engaged in field work in 1905 were, as in the previous seasons, divided into two main parties, one under the direction of the chief astronomer and one under the chief topographer. These in turn were divided into various subparties.

#### ASTRONOMIC PARTY

The chief astronomer's party was divided into a triangulation subparty and a monumenting subparty, both employed on the section of the boundary from the Kootenai River at Porthill, Idaho, to the summit of the Rocky Mountains. In addition thereto, the chief astronomer maintained a magnetic party which during the season made observations along the boundary from Point Roberts to Phillipps Creek east of Gateway, Montana. This work, not being entirely germane to the resurvey and demarcation of the boundary, is not herein described.<sup>13</sup>

#### TRIANGULATION SUBPARTY

The triangulation subparty gathered at Gateway, Montana, about the middle of May. Their first objective was to connect the boundary monuments in the vicinity of Gateway, between Phillipps Creek on the east and Purcell summit on the west, with the triangulation scheme. They had intended to continue westward tying in monuments to the triangulation scheme, but the snow was still too

<sup>13</sup> The results of the work are to be found in the records of the United States Coast and Geodetic Survey.

deep on the mountains to permit horses to cross the high summits and further work was postponed until the observations in the vicinity of Gateway had been completed. In addition to doing triangulation, the party set 4 monuments in the vicinity to fill in a gap left in the monumenting of the previous autumn.

Upon the completion of the work on June 10 at Gateway, the party moved by railroad to Belton, Montana, in order to approach the Rocky Mountains by the way of the Flathead Valley. At Belton the necessary outfitting and recruiting were done for the formation of a monumenting subparty, and on June 14 the party set out with a four-horse wagonload of supplies for the boundary. Reuter's ranch, where the horses and outfit of the triangulation party of 1904 had been cared for during the winter, was reached on the 15th. Here the camp outfit was overhauled and the party organization completed. The two parties then proceeded up the river and established a base camp 4 miles south of the boundary, from which both parties might operate.

Notwithstanding the probability of snowstorms occurring in these altitudes as late as July, and the difficulty of crossing the winter's snow still remaining, the experience of the triangulation party of 1904 with smoke, in the latter part of the season, influenced the choice of the early part of the season as being the more favorable to success.

The triangulation subparty first moved west of the Flathead and rebuilt the signals on stations "Canada" and "Tuchuck", then crossed to the east side and occupied station "North Divide", where it was delayed for some time by snow and hailstorms. Returning west, station "Hefty" was occupied and the alinement of a monument site nearby was checked. This done, the party recrossed to the east side of the Flathead and occupied stations "Kishenehn", "South Divide", Monument 272 on the summit of the Rocky Mountains, and "Kintla", completing the program as planned. The last station in this list, "Kintla", is the loftiest and most difficult to climb of the boundary stations in the Rocky Mountains, being 9,928 feet in elevation and extremely steep. Six days were spent in reaching the station and making the observations.

Upon the completion of the Rocky Mountain observations, the party moved westward to Gateway, stopping on the way to reoccupy stations "Tuchuck", "Canada", and "Green." Arriving at Gateway August 1, the party continued westward over the Purcell summit and took up the triangulation which had been postponed earlier in the season.

In this western work, the party made observations to connect 24 boundary monuments with the triangulation stations, checked the alinement of a number of intermediate monument sites, opened up main trails for the use of the monumenting party, and cut trails to four monument sites. Observations were made from station "Ewing" of the main scheme which up to this time had not been done.

The weather during the last part of September and the first of October was very stormy and greatly retarded progress. Fortunately, the monumenting party completed its work on September 25, and was able thereafter to assist the triangulation party to such an extent as to overcome the weather handicap and permit the completion of the triangulation by October 15.

*MONUMENTING SUBPARTY*

The monumenting subparty was formed at the base camp on the Flathead River 4 miles south of the boundary on June 17 in conjunction with the organization of the triangulation subparty. Arrangements had been made to have the monuments and portland cement freighted from Belton to the base camp. Monuments 258 to 267 (present numbers) were packed to their sites and set between June 19 and July 8 without especial trouble or incident.

The remaining 5 monuments, numbers 268 to 272, had to be placed on high and rocky summits which were difficult to reach. They were hauled by wagon to Lower Kintla Lake and from there were distributed by boat and pack train to Upper Kintla Lake and to the nearest points of approach to their sites. The final packing to the sites had to be done by men.

Monument 272 was set on the crest of the Rocky Mountains after two days' hard work. The back-packing was for a distance of over a mile and up a cliff 500 feet high. Fortunately, sand was found near the site and the melting snowbanks furnished water on the spot for the concrete mixture. The site for Monument 271 was easy of access but it required two days to check the alinement on account of the two almost inaccessible points east and west of it which had to be occupied by transit. It required four days' hard work to place and set Monument 270 on the peak nearly 4,000 feet above the lake shore. Monument 269 is nearly 5,000 feet above the lake and had to be back-packed on the hard climb from the lake. Monument 268 was the most difficult to set of all those in the Rocky Mountains. It is on the precipitous west end of the Sawtooth or Boundary Mountains and seemed inaccessible from below. The trail used led over the summit of the ridge and the monument was finally lowered by ropes to its site below the cliffs. Six days were required to get it from the lake to its site and to set it. By the exercise of great care and by good fortune the work of setting these monuments was accomplished without accident to man or horse although narrow escapes were frequent.

The monument setting in the Rocky Mountain section was completed on August 2 and the party immediately started west over the Phillipps Creek trail for Gateway. It had been intended to move the party by team to Belton and by railroad from there to Yahk Siding, British Columbia, but a labor strike on the part of the telegraph operators so interfered with railroad dispatching as to make this impossible. Consequently, the move had to be made across the mountains by pack train. To lighten the loads and facilitate the move, an extra pack train of six animals and a packer were hired. The trip to Gateway and from there to Yahk Siding was completed on August 14.

Monuments and cement for the interval of boundary from the Yaak River to Porthill had been delivered by rail and wagon to convenient depots near the boundary. From these depots, they were moved to their proper sites by pack train. The hired pack train was retained to assist with the work.

Beginning with Monument 228, where monumenting had been discontinued in 1904, the party set the 22 monuments to and including Monument 207 at Porthill, Idaho, finishing on September 25.

There was one monument still to be set at Laurier, Washington, to mark the railroad crossing. The foreman and one man were sent there to locate the site and set the monument, which was done on September 29.

At Porthill the remainder of the monumenting party joined the triangulation subparty and assisted it for the rest of the season. The combined party disbanded at Bonners Ferry, Idaho, on October 17.

The operations just described completed the field work of the astronomic party on the boundary west of the summit of the Rocky Mountains. The field equipment of the party was no longer needed, and therefore, the pack trains were assembled at Bonners Ferry and sold at public auction. The still serviceable camp equipment was gathered together and stored at Gateway, Montana, with the thought that it might be used by inspection parties of the future.

The personnel of the United States astronomic party in 1905 was as follows: Chief of party, C. H. Sinclair; assistants, E. R. Martin, William Kendrick; and 10 hands.

#### TOPOGRAPHIC PARTY

The program for the United States party under the chief topographer contemplated the completion of all field work on the boundary between the Skagit and Similkameen Rivers, consisting of checking the monument sites, extension of triangulation, and the running of some level lines; the continuation of triangulation undertaken by the United States Geological Survey, east along the line from Blaine, Washington; and the determination, by levels, of an elevation at the boundary crossing of the Columbia River.

The first undertaking of the season was the determination of an elevation at the boundary crossing of the Columbia River. A party of two ran a checked level line from a Geological Survey bench mark at Meyers Falls, Washington, over the Great Northern Railway for a distance of 45 miles to Waneta, British Columbia, and set 15 permanent bench marks, one at the boundary crossing and the others at intervals of about 3 miles. Leveling was begun May 7 and completed June 7.

The main party assembled at Loomis, Washington, the last of May and established camp at McDaniel's Ranch, the base camp of 1904. Before the party met, arrangements had been carried out for the delivery of monuments and monumenting material to the boundary pack trail routes, thereby making it possible for the party to begin distributing and setting monuments at once. The first move was to the crossing of the Similkameen River. From this camp Monuments 108 and 109 were set. A return was then made to McDaniel's Ranch and the entire outfit moved to Gold Hill. From Gold Hill the party moved to a camp in Horseshoe Pass about one mile south of the boundary and was there occupied for a time in clearing the trails cut the previous season.

The party was then divided into a triangulation subparty and a monumenting subparty.

#### TRIANGULATION SUBPARTY

The triangulation subparty first made an additional check of the alinement of the interpolated monument sites, the testing of which on the first chord west of the

Similkameen River was quickly accomplished. To the westward, the work was held up from June 14 to June 28 by deep snow in the high mountain passes, where in addition to the winter's snow, which still blocked the trails, new snow fell nearly every day. After this unavoidable delay the work proceeded without interruption to completion at the Skagit River on July 28.

On July 29 the party commenced extending triangulation westward across the Skagit for the purpose of furnishing control to the Canadian parties and, at the same time, to connect with the triangulation of a United States Geological Survey party working eastward from Blaine and Bellingham, Washington. The completion of this work as planned was prevented by smoke and long continued bad weather culminating in an early snowfall of such depth as to force the party to withdraw from the mountains on October 1. However, triangulation was carried westward far enough to serve the Canadian needs and to obviate the necessity of continuing the work another season. The party reached Loomis on October 3.

#### MONUMENTING SUBPARTY

Two monumenting subparties consisting of two fully equipped crews started from Horseshoe Pass on June 9. From June 9 to July 5 each crew maintained its own camp; thereafter both operated from a common camp. Supplies came by pack train from Loomis until the latter part of July. The supply base was then transferred to Princeton and there maintained for the rest of the season.

Distributing and setting monuments were generally carried on rapidly and without unusual difficulties. Monuments and material were packed to the sites by horses save in two instances where the precipitous approaches necessitated back-packing by the men. Monument 95 on the north shoulder of Cathedral Peak was the only one difficult or dangerous to set. It stands on a knife-like rock ridge so narrow that a place had to be blasted out to make room for the monument. At the upper end of the climb, monument and material had to be lifted up by ropes from shelf to shelf on the cliffs. In making the ascent one man lost his footing and fell 30 feet to a rock shelf below, but miraculously sustained only severe body bruises.

Setting the 38 monuments from the Similkameen River to the Skagit River was completed by setting Monument 72 on the east bank of the Skagit on August 28.

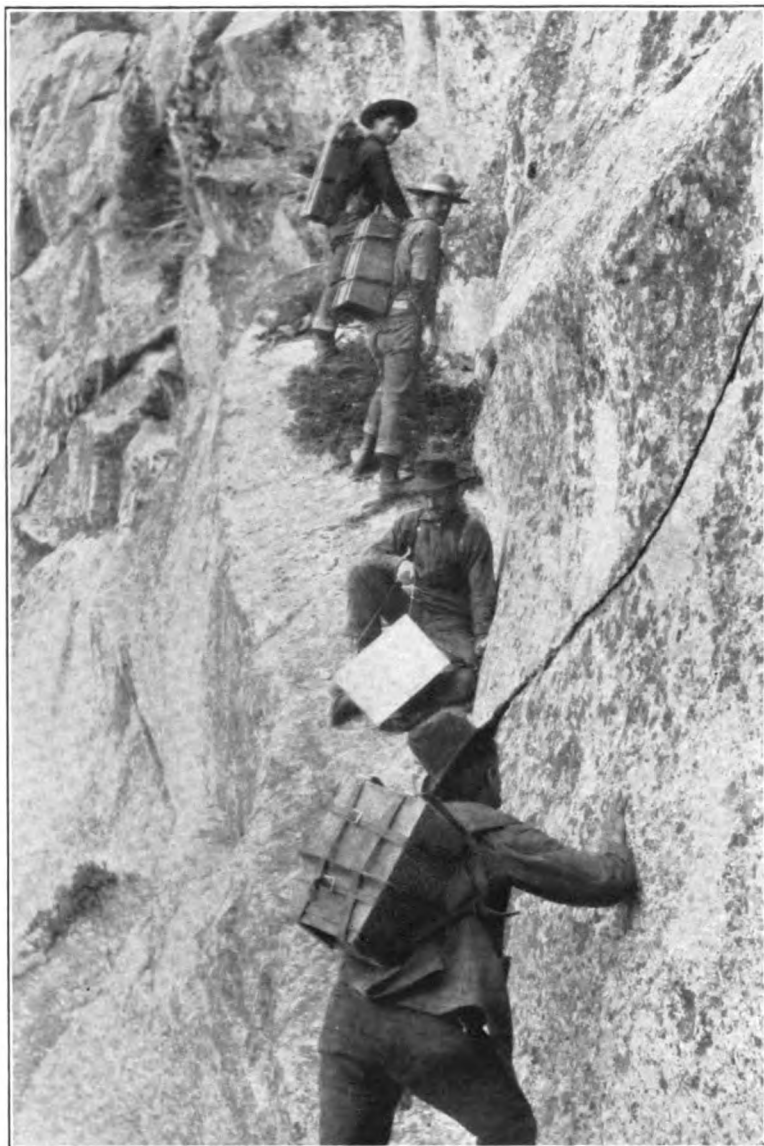
#### LEVEL SUBPARTY

During the first week in September a level party of 4 men, equipped with camp outfit and pack train, was put in the field for the purpose of checking the line of



A CEDAR LOG USED AS A BRIDGE ON THE SKAGIT RIVER

levels run in 1904 from Barron, Washington, to the boundary crossing of the Pasayten River. The party began work September 7 at the bench mark established in



TRANSPORTING THE SECTIONS OF AN ALUMINUM-BRONZE MONUMENT OVER A DIFFICULT BIT OF TRAIL IN THE CASCADE MOUNTAINS

1904 at the boundary crossing and leveled southward, over the line of the previous season, to Barron.<sup>14</sup> The line was closed on the bench mark at Barron on September 30.

On the return trip by the way of the boundary trails to Loomis, Washington, the party was caught in an early snowstorm and before the trip was finished had to force its way without feed for the horses over mountain passes through snow from 3 to 4 feet in depth. After a week of strenuous travel the party arrived in Loomis on October 7.

For the purpose of making a comparison of the plane-table method used by United States parties with the phototopographic method used by Canadian parties in making topographic maps, the United States chief topographer had agreed with the Canadian chief of party to duplicate the surveys done by the Canadian parties on the

strip of territory 2 miles wide along the south side of the boundary from the Similkameen River to Osoyoos Lake.

This survey was made by a party organized on October 6-8 from the returning mountain parties and headed by the chief topographer. The work was ended October 30.

A comparison of results showed the two methods to be equally satisfactory in a country of bold relief.

<sup>14</sup> Barron, Washington, was a mining settlement near the crest of the Cascade Range, to the west and not far from States Pass at the heads of Ruby Creek, the Pasayten and the Methow Rivers. The name no longer appears on maps or in the Postal Guide (February 1936).

As the parties returned from the mountains to Loomis, the hands were paid off, the outfits stored, and the horses pastured until only the small topographic party remained in the field. At the end of October that party had brought to a close the field operations of the United States parties on the reestablishment and remonumenting of the 49th parallel land boundary west of the summit of the Rocky Mountains. No further use would be had for the pack trains and much of the camp equipment on hand. Before leaving the field, the topographic party sorted and inventoried the camp and work equipment, placed that part of it which was still serviceable in storage at Loomis, and prepared the rest for sale. On November 4 the condemned equipment and all of the pack horses were disposed of by public auction at Loomis and the party disbanded.

The personnel of the United States topographic party was: Chief of party, E. C. Barnard, Chief Topographer; assistants, J. G. Hefty, W. B. Reaburn, Thomas Riggs, Jr., George Neuner, Jr., W. W. Wineland; and 15 hands.

### SEASON OF 1906—POINT ROBERTS TO THE SKAGIT RIVER

The field operations of 1906 were confined to the boundary extending from Point Roberts to the Skagit River. The triangulation connection with the work of the United States Geological Survey which had been unsuccessfully attempted by the United States triangulation party in 1905 was completed by a United States Geological Survey party through a cooperative arrangement between the United States Section of the Boundary Commission and the United States Geological Survey. All other work on this particular section of the boundary was done by the Canadian Section of the Boundary Commission.

#### CANADIAN PARTY

The Canadian party was organized at Sumas Prairie the last week in May. It consisted of 8 surveyors, 42 hands, and 42 horses. It was divided as work progressed into several subparties to facilitate operations.

#### FIRST SUBPARTY

The first subparty, a line measurement party of an assistant and seven men, was detached at Sumas Prairie and detailed to make a double-rodded stadia measurement from monument to monument along the boundary west from Monument 41 and to secure topographic data. This party carried the stadia measurement west as far as Monument 21 and made topographic surveys of the towns of Sumas and Clearbrook, Washington, and Huntingdon, British Columbia. They then returned to Monument 41 and measured the line to Monument 43 in the Columbia Valley.

A pack-train camp was provided for the party in the Columbia Valley in order that it might project the chord from Monument 43 eastward to the monuments in the Tamih Valley.



The party moved from the Columbia Valley over the trail, constructed the previous season, to the summit of the first high ridge crossed by the boundary. On this ridge, after a good deal of heavy chopping and delays caused by smoky weather, the first point on the trial line was determined on a prolongation of the line passing through Monuments 41 and 43. The plan of operation was to transit the line from ridge to ridge. This required the cutting of a vista across the summits. Some of the summits were quite broad and after a point had been placed on the line, the vista had to be opened for a quarter of a mile or more in order to secure a sight to the next ridge. Due to frequent camp changes, a number of men were kept constantly on trail construction, and when smoke prevented line projection all hands were so occupied. Several canyons or ravines 1,500 to 2,000 feet deep, tributary to the Chilliwack River, crossed the boundary, making it necessary to build trails around their heads, cutting the grades along the steep hillsides through heavy timber and windfalls.

About 10 miles east of the Columbia Valley the boundary crosses a rocky ridge at an elevation of nearly 6,000 feet. Here to the south of the line is a beautiful alpine park area with grass-covered slopes, intercommunicating lakelets, and scattered clumps of fine evergreen trees. This park made an ideal camping place and its meadows furnished excellent forage.

From the park eastward to the monuments on Tamihi Creek the forest growth was large and dense. The jungle of underbrush and windfalls made travel, even on foot, almost impossible without trails. The windfalls, often from 6 to 9 feet in diameter and from 150 to 200 feet long, could be used as footpaths when fortunately lying in the direction of travel, but when lying crosswise, as they perversely seemed



TAMIHI MOUNTAIN, BETWEEN SILESIA AND MIDDLE CREEKS, CASCADE MOUNTAINS. VIEW FROM THE NORTH

to do most of the time, presented an obstacle only to be overcome by improvising a ladder or by crawling around either end through the dense brush and devilscub<sup>15</sup> which often attained a height of 10 or 12 feet. After much time and strenuous labor, the trail was completed through the forest to a junction with the Tamihi Valley trail, the trial line was completed and its offset from boundary cairn 46 (now Monument 52) was measured.

The party then turned westward to the first summit east of Columbia Valley and determined the true line on that summit by laying down the offset computed from the results of the trial line. Vista cutting on the true line to the eastward was then begun. However, the season was getting late, the weather was wet and cold at this high altitude, and work could no longer be carried on to advantage. The party suspended operations on October 20.

#### MAIN PARTY

After the detachment of the subparty whose operations have just been described, the main party moved from Sumas Prairie to and up the Chilliwack Valley to McGuire's ranch, where headquarters were established for the season. The buildings and corrals on the ranch were rented and the owner was hired to receive and care for supplies.

The approach to the boundary from the Chilliwack Valley was used by the western Canadian reconnaissance party in 1901 and many miles of trail were built at that time. These trails were now badly overgrown with brush and filled with windfalls. The first task of the party of 1906 was to reopen the old trails and to build additional ones. This job proved to be one of the heaviest of the season.

An attempt to bridge the Chilliwack River near the mouth of Tamihi Creek was made by felling trees across it as in 1901. Now, however, the trees snapped like pipestems in the swift water and the plan had to be abandoned. A steel cable was secured and swung across the stream, by aid of which a serviceable one-span bridge was constructed.

#### SECOND SUBPARTY

Upon the completion of the bridge, a second subparty of 10 men, in charge of an assistant, was detailed to open the trail of 1901 up Tamihi Creek to the boundary, to search for boundary cairns 44, 45, and 46 (now Monuments 50, 51, and 52), and to open up the old vista between them. A passable trail to the boundary was soon built and a search instituted for the cairns. The unmistakable remains of cairn 46 were found agreeing with the description of the United States reconnaissance party of 1901, and the removal of the stones revealed the original center stake. The old vista was cleared westward from this point and measurements made to where cairns 45 and 44 should have been according to the records given by the original Commission. Although a most careful and painstaking search was made, the cairns could not be found. A representative of the United States Commissioners took part in the search and concurred in the opinion that snow and rockslides had obliterated all

<sup>15</sup> A rank growing and extremely spiny araliaceous shrub of the northwest Pacific coast—*Echinopanax horridus*.

traces of them. The monuments eventually set to take their places were located on the curve of the parallel passing through cairn 46 and as near as practicable to the positions of the original marks.

The party next proceeded to project the chord east from boundary cairn 46 (now Monument 52) to boundary cairn 47 (now Monument 55) on Silesia Creek. The chord crossed an almost unscaleable shoulder of Red Mountain at an elevation of 7,300 feet and hence was most difficult to establish. To complicate matters smoke from forest fires prevented observations for days at a time. Finally, after ascending the Red ridge nine times, an approximate location of the chord was made and the party began cutting a wide vista along it from cairn 46.

During the smoky weather, a successful search had been carried on for the original latitude station on Tamihi Creek and preparations were made to carry a small triangulation scheme from it to the boundary. However, continuous smoky weather and the exigency of line clearing prevented the execution of the triangulation.

The final adjustment of the chord from cairn 46 to cairn 47 was completed on September 9. The vista cutting was carried up the slope of Red Mountain to timber line by October 18. The weather then became so inclement that work could not be continued to advantage. The party withdrew from the mountains, reached McGuire's ranch on October 20, and there disbanded.

#### MAIN PARTY

The main party, whose trail-building operations to the mouth of Tamihi Creek have been recorded, continued that work up the Chilliwack Valley to Thurston's



LOOKING NORTHEAST FROM RED MOUNTAIN TRIANGULATION STATION IN THE CASCADE MOUNTAINS. THE PROMINENT PEAK ON THE LEFT IS TAMIHI MOUNTAIN; THE BOUNDARY VISTA ASCENDING THE EASTERN SLOPE OF THE SILESIA CREEK VALLEY IS SEEN ON THE RIGHT

ranch above the mouth of Silesia Creek. Here the party was again divided and a packers' camp and depot were established to keep the two parties supplied. The main party continued trail building up the Chilliwack when the third subparty worked its way up Silesia Creek.

#### THIRD SUBPARTY

The third subparty consisted of an assistant and eight hands. After pushing its way up Silesia Creek over the old trail of 1901 to the boundary, it established the 4-mile chord between original boundary cairn 47 on Silesia Creek and cairn 48 on Middle Creek (now Monuments 55 and 57) and made a phototopographic survey.

When this chord had been established, the party returned to the Chilliwack River and thence up Middle Creek to the boundary.

The next procedure was to start a trial line east from original boundary cairn 49 (now Monument 58). In the meanwhile, the main party had reached Dolly Varden Creek and started a trial line west from boundary cairn 50. By prearrangement, the two parties met on July 15 on the most eastern of the two intervening high summits and made a connection between the two trial lines. A system of signals was devised for jointly establishing the true line on the summits. This was successfully accomplished on July 25 after several delays caused by smoky weather.

During the projection of the Middle Creek-Dolly Varden chord, the axmen of the party had been cutting vista on the chords both east and west across the Middle Creek Valley. They completed the cutting on July 28.

The party then moved down the Chilliwack and up the Fraser Valley to Hope. Supplies, cement, and monuments had been delivered at Hope for the Skagit-Depot Creek section of the boundary, left uncompleted in 1905. An extra pack train was hired to help transport the party and supplies to the boundary on the Skagit River. Arriving at the Skagit crossing, the party worked westward, completing the vista cutting, building trails to the monument sites, and distributing material for the monuments. They also carried on phototopographic surveys and completed triangulation observations at stations "Whitworth" and "Glacier." Their work finished, they moved out by the way of Hope to Chilliwack, British Columbia, where they disbanded on October 1.

#### MAIN PARTY

What remained of the main party after the third subparty had been detached, continued trail building to Chilliwack Lake. Substantial bridges were constructed across tributary streams and the main stream was bridged again near the mouth of Middle Creek by felling a fir tree 9 feet in diameter across the stream.

The trail was completed to the foot of Chilliwack Lake on May 20. A cache was built and a large raft constructed to transport the party and supplies to the head of the lake. A search along the lake shore resulted in the finding of the cedar dugout used by the reconnaissance party of 1901. Using raft and canoe, party and outfit and two mules were transported to the head of the lake. From the head of the lake, the party moved with the two mules about a mile up Dolly Varden Creek to the vicinity of the boundary and camped.

A trail was cut up Depot Creek from its mouth to a junction at the boundary with the trail built from the Skagit River in 1905. The crew was able to work from the Dolly Varden camp by using the canoe between the head of the lake and the mouth of Depot Creek.

From the Dolly Varden camp the line was projected westward to meet the work of the third subparty, then eastward to Depot Creek, cairn 52 (now Monument 65). Trails were built to the intermediate monument sites; triangulation stations were selected, marked, and signaled; and the vista was cut along the boundary across the Dolly Varden Creek valley.

Seven monuments and the cement had been forwarded to the head of Chilli-wack Lake. The chord to the west between cairns 50 and 49 was established on July 25. Everything being ready, a crew of five men was put at monument setting. Monuments now numbered 61, 62, 63, and 64 were set from the Dolly Varden Creek camp.

The entire party next moved by raft down Chilli-wack Lake to the mouth of Depot Creek. Thence by back-packing and with the two mules, camp was moved up the Depot Creek trail to within a mile of the boundary. From this camp vista cutting was completed to the west from cairns 53 and 54 (now Monuments 66 and 67). The monumenting crew set Monuments 65, 66, and 67, present numbers.

The monumenting crew then took the two mules and moved eastward to meet the third subparty coming from the Skagit River. After obtaining additional pack horses from them, they set the monuments from Depot Creek to the Skagit River,



LOOKING NORTHEAST ACROSS MIDDLE CREEK FROM A POINT 1 MILE NORTHEAST OF BOUNDARY MONUMENT 56, CASCADE MOUNTAINS

Nos. 65 to 71, inclusive. This was done by the time the third subparty completed its work, when they both moved out and disbanded on October 1 at Chilliwack.

The main party completed its work on Depot Creek on September 29. It then traveled by way of the Chilliwack Valley and up Silesia Creek to the boundary crossing of that stream. Here they cut the vista across the valley to timber line on each side, a distance of about 2 miles on the east and about 1 mile on the west side of the creek. The party finished work and started for McGuire's ranch on October 22, and after spending a day on the way in reinforcing the supports of the Tamihi bridge, reached the ranch and disbanded on October 25. This closed the field work for the season.

While there was no special topographic party in the field during the season, phototopography was carried on from the various camps as time and weather permitted.

At the beginning of the season, a triangulation party was organized. But work had no more than started when the observer in charge of the party, Mr. Howell Bigger, was stricken with a severe case of appendicitis. After being examined by a doctor in Sumas, he was sent to a hospital in Vancouver and operated on. The case was so far advanced, however, that in spite of every care he died a month later, on July 6.

It was not possible to secure an experienced observer to take the place of Mr. Bigger and continue the triangulation. The work was therefore postponed until the next season.



A HIGH PEAK OF THE CASCADE RANGE USED AS A PHOTOTOPOGRAPHIC STATION, 1 MILE EAST OF MIDDLE CREEK AND 1½ MILES NORTH OF BOUNDARY MONUMENT 58

The personnel of the Canadian party was: Chief of party, J. J. McArthur, D. L. S.; assistant in charge of triangulation, Howell Bigger, D. L. S.; assistants in charge of line projection, Noel J. Ogilvie, D. L. S., S. S. McDiarmid, D. L. S.; assistants in charge of vista and trail cutting, E. T. de Coeli, Stanley Everall; assistant in charge of monument setting, J. M. Sheppard; general assistant, W. P. Near; and 42 hands.

#### SEASON OF 1907—POINT ROBERTS TO THE SKAGIT RIVER; AND JOINT INSPECTION WEST OF THE ROCKY MOUNTAINS

The field operations during the season of 1907 included the virtual completion of the Point Roberts-Skagit River section of the boundary by Canadian parties and the inspection of monuments from Similkameen River to the summit of the Rocky Mountains by a joint United States and Canadian party.

##### CANADIAN PARTIES

An assistant was sent to Chilliwack, British Columbia, early in April to make preliminary arrangements for the Canadian parties. He employed several local men who had previously worked with the parties and proceeded to the Knox Ranch on Upper Sumas Prairie where the pack horses had been wintered.

The horses which were found to be in bad shape were taken off pasture and fed grain and hay to condition them for the season's work. The camp outfit was brought from McGuire's ranch where it had been stored, and camp was set up. Before the party had been entirely assembled, the spring flood of the Fraser River so overflowed the prairie that camp had to be moved back to the base of Vedder



TRIANGULATION STATION "MIDDLE", IN THE CASCADE MOUNTAINS, IS ON THE HIGH PEAK SEEN ON THE LEFT. VIEW FROM THE SOUTHWEST



Mountain. The final organization of the party was completed during the last week in April.

The full party consisted of 7 surveyors, 40 hands, and 28 pack horses. As in previous seasons, it was divided into several subparties.

#### TRIANGULATION SUBPARTY

A triangulation subparty was first detached with instructions to complete the triangulation begun and postponed in 1906, and to connect with the triangulation of the United States Geological Survey parties which had been carried eastward from Blaine and Bellingham, Washington. After three stations had been occupied, the large theodolite was so badly damaged by an accident that it could no longer be used. No other instrument of the same precision being readily available, the party observed with a 4-inch theodolite in order to furnish control for the topography being done by other parties. Although the party remained in the field the entire season, it was unable to furnish results of the required precision, and the completion of the work had to be postponed until 1908.

#### SECOND SUBPARTY

A second and larger subparty was formed at the organization camp and sent to Columbia Valley to begin cutting vista east on the chord from original Monument 43 to original boundary cairn 44 (now Monument 50). The forest growth was large and dense. The weather was so rainy and wet during the early part of the season that a full day's work was seldom possible. The boundary crossed canyons from 500 to 2,000 feet deep. Climbing up and down across these through the wet brush was so trying that axmen would not stay on the job. Under these adverse conditions the party made slow progress and it was not until September 15 that they joined the third subparty working west from Green Ridge. The party then returned to Columbia Valley where the axmen were paid off.

#### MAIN PARTY

Returning to the account of the main party at the organization camp at the base of Vedder Mountain: After the two subparties had been detached the main party moved around to the Chilliwack Valley and attempted to reach the boundary on Tamihi Creek. The spring freshets had carried out the bridge across the Chilliwack at the mouth of the Tamihi and the river was still so high it could neither be forded nor bridged. Of necessity a new trail was opened on the south side of the river through the Indian reservation and over a high mountain spur to the mouth of Tamihi Creek. This trail was used until the first of July. The river was then bridged a short distance below McGuire's ranch by felling a large tree across the deep channel to a gravel bar from which it was possible to ford to the farther shore.

The main wagon road up the Chilliwack was also found washed out at the "Big Slide." This obstruction necessitated the establishment of the supply camp well down the river at a point about 3 miles above the Vedder bridge.



When the detour trails had been completed the party made its way up the Tamihi Valley to the boundary. On this trip, also, trails were found badly washed, and in several instances completely obliterated by landslides.

At the boundary, the party was divided into a third and fourth subparty.

#### THIRD SUBPARTY

The third subparty went westward to Green Ridge (now marked by Monument 49), and began cutting the vista westward along the chord to meet the second subparty working east from Columbia Valley. The work was connected on September 15 and all moved out to Columbia Valley, where the axmen were paid off.

#### FOURTH SUBPARTY

The fourth subparty cut the vista from original boundary cairn 46 (now Monument 52) west to Green Ridge (Monument 49) where the third subparty had started. Monuments now numbered 50 to 54, inclusive, were set. Thereafter, the party was merged with the monumenting and topographic parties.

#### MONUMENTING PARTIES

In addition to the subparties whose work has been described, a monumenting party, early in the season, set monuments on the Middle Creek and Silesia Creek sections of the boundary from Monument 55 to Monument 60 (present numbers), inclusive, and then when enlarged by the fourth subparty, set Monuments 21 to 49 (present numbers), inclusive, which were all in place by September 20.



A VIEW OF THE SUMMITS OF THE CASCADE MOUNTAINS, LOOKING EAST ACROSS THE VALLEY OF SILESIA CREEK FROM TRIANGULATION STATION "RED" ON THE SUMMIT OF RED MOUNTAIN

There still remained to be set Monuments 9 to 20, inclusive, and Monuments 2 to 4, inclusive, on Point Roberts. A party, accompanied by a topographic sub-party of three men, was sent west to set Monuments 9 to 20 and to acquire additional topographic data, and a second party was sent to Point Roberts to set the three monuments there and to recut the vista. These parties, the last to leave the field, finished work on October 20 and returned to Huntingdon, British Columbia, where they disbanded.

As in the previous season, no special topographic party was in the field, but topography was carried on from other camps. The data thus secured furnished all information necessary to complete the maps from the Skagit River to Point Roberts.

Early in August the Commissioners made a joint visit to the parties. An examination of the boundary across Columbia Valley was made, and after a trip up Tamihi Creek, Monuments 50 to 52, which had been set in place of original cairns 44, 45, and 46, were inspected. The Commissioners satisfied themselves that the original line had been recovered at lost cairns 44 and 45.

The Canadian parties, during the season of 1907, completed all work planned except a small amount of triangulation. This triangulation, though needed in the adjustment and computation of the general scheme of triangulation, was not essential to the reestablishment and monumenting of the boundary on the ground. There remained only a joint inspection of the work of the separate United States and Canadian parties. This inspection was already under way.

The personnel of the Canadian parties was: Chief of party, J. J. McArthur, D. L. S.; assistant in charge of triangulation, F. H. Mackie, D. L. S.; assistants in charge of line work and vista cutting, S. S. McDiarmid, D. L. S., E. T. de Coeli, C. R. Westland; assistant in charge of monument setting, J. M. Sheppard; foreman, Stanley Everall; and 40 hands.

#### JOINT INSPECTION PARTY

By the end of 1906, the reestablishment and remonumenting of the 49th parallel boundary west of the summit of the Rocky Mountains had been fully completed from the Skagit River to the summit of the Rocky Mountains and it was expected that the remainder of the work from the Skagit River to Point Roberts would be completed during the season of 1907. Three-fourths of this boundary was ready for joint inspection and the other fourth would shortly be ready.

In order that the joint inspection might follow as closely as possible upon the completion of the reestablishment of the line, the Commissioners laid plans to begin the inspection in the spring of 1907. In accordance with these plans, a joint inspection party was organized at Laurier, Washington, about the middle of June. As organized, the party consisted of a representative of each Government and 5 hands, with a train of 21 saddle and pack horses.

The instructions to the party were that they were to inspect the reestablishment, marking, and remonumenting of the line; to visit each and every monument; to number the monuments from No. 1 consecutively to the eastward by attaching

to each the number plate, bearing its proper number,<sup>16</sup> and to photograph and make a written description of each monument.

The actual work of inspection was begun on June 27. On account of snow still lying on the higher mountains, the party began at Laurier and worked west across the comparatively low country to the east side of Osoyoos Lake, where on July 10 they inspected and numbered Monument 118. On this section of the line the inspection revealed no discrepancies or damage to monuments requiring correction other than a broken center rod in Monument 158 south of Grand Forks, British Columbia. The monument was repaired by fastening the sections together with screws inserted into tapped holes drilled through the overlaps of the sections.

By the time Osoyoos Lake was reached the season was sufficiently advanced to permit travel in the high mountains. Up to this time the character of the country had permitted the use of wagons for moving camp but now it was necessary to abandon the wagons for the pack train. Preparations for moving east from Laurier were completed on July 17.

The party moved across the Kettle River, inspected the line, and numbered the monuments between the Kettle and Columbia Rivers. This was completed on July 25.

Upon reaching the Columbia River the party encountered the usual difficulty of those days in crossing. The pack train was sent up the river to Trail, British Columbia, to cross on the ferry so as to be on the north side of Clark Fork (Pend-d'Oreille) River. At Trail the ferry was found to be in disrepair and not in operation. Upon appeal, the mayor of Trail called a special meeting of the town council to appropriate money for repairing the ferry. At the end of four days repairs had been made and the pack train crossed the river. It reached Waneta on the north bank of Clark Fork on July 30.

While the pack train was moving around by way of Trail, the line was inspected between the Columbia River and the Clark Fork crossings, by using horses hired at Boundary, Washington, on the south side of Clark Fork. On this trip Monument 183 was found to have a broken center rod. It was repaired in the same manner as Monument 158.

On August 1 the party started eastward on the inspection from Clark Fork to the west crossing of the Kootenai. Several delays and untoward incidents occurred—many windfalls blocked the trails; a thunder storm accompanied by hail and snow kept the party in camp all one day; a pack horse carrying the cook stove lost her footing on a rocky piece of trail and rolled 200 feet down the hill through tangled brush and windfalls. Strange to say, neither horse nor pack was seriously injured, but it required a day's work to cut a trail by which to recover them. On another occasion one of the axmen employed in clearing the trail ahead of the pack train cut his foot across the instep so seriously that he had to be taken out some 18 miles over the trail to a doctor for treatment. This delayed the party for two days. The party finally reached Porthill at the west crossing of the Kootenai on August 21.

They remained at Porthill reoutfitting and having horses shod until August 24, then moved eastward to Round Prairie. The horses strayed from this camp and

<sup>16</sup> See typical monument, p. 120.

were not recovered until the 28th. No time was lost on this account, however, as the time was spent inspecting the nearby boundary and monuments on foot.

From Round Prairie the party continued along the line eastward, interrupted from time to time by rain, snow, and hailstorms, by the necessity of reopening the trails blocked by windfalls, and on one occasion by a pack horse dropping dead on the trail. Gateway, Montana, was reached on September 19.

At Gateway, time was taken to have the horses reshod and to make arrangements to have supplies sent by wagon from Belton, Montana, up the Flathead Valley to the boundary to save packing across the mountains.

On September 26 the party moved east from Gateway carrying on the inspection toward the Flathead River. They were traveling light on this trip, and, the trails being in fair condition, good progress was made. On September 29 they passed Frozen Lake and inspected Monuments 257, 258, and 259. Monument 258 was found to have a broken rod; it was repaired in the same manner as the other two found in like condition. That evening, September 29, the party crossed Hefty Pass at an elevation of 7,300 feet and made camp in the cove below it overlooking the beautiful Flathead Valley. The danger of being trapped in the mountains by heavy snows was past.

The Flathead was crossed on September 30 four miles south of the boundary and camp made at the old base camp of previous seasons. Working eastward toward the summit of the Rocky Mountains, camps were made at Lower Kintla Lake and at the grass-covered slide under the Sawtooth or Boundary Mountains. From these camps and one side camp, the climbs were made to the monuments on the high peaks of the Rockies until Monument 272 on the summit of the Rocky Mountains was reached on October 8. The next day the party moved down the Flathead to Round Prairie, where the horses were left for the winter. The camp outfit was hauled to Belton and shipped to Gateway to be placed in storage. The party was then disbanded.

During the season the party inspected 242 miles of the boundary from Monument 118 on the east bank of Osoyoos Lake to Monument 272 on the summit of the Rocky Mountains. All of the 155 monuments (118 to 272, inclusive) were visited. All monuments, including their cement bases, were found in good condition except three, numbers 158, 183, and 258. In these three the center rod had been broken. Sufficient examinations and tests were made to convince the inspectors that the boundary had been properly retraced and that all of the monuments were properly placed on original sites or on straight lines between original sites. In accomplishing this inspection, the camp had been moved 800 miles by wagon and pack train, and the inspectors had traveled 1,400 miles on foot and on horseback.

Upon completion of the inspection, the inspectors submitted jointly written and jointly signed reports of their work to their respective Commissioners.

The personnel of the joint inspection party of 1907 was as follows: Inspector on the part of Canada, Noel J. Ogilvie, D. L. S.; inspector on the part of the United States, C. H. Sinclair; and 5 hands.

## SEASON OF 1908—CONCLUSION OF WORK WEST OF THE ROCKY MOUNTAINS; AND THE BOUNDARY FROM COUTTS, ALBERTA, 100 MILES EASTWARD TO LODGE CREEK

During the season of 1908 field work was brought to a conclusion, for the time being, on the boundary west of the summit of the Rocky Mountains and work was taken up on the section east of the summit of the Rocky Mountains.

### THE BOUNDARY WEST OF THE SUMMIT OF THE ROCKY MOUNTAINS

West of the summit of the Rocky Mountains a small Canadian party was engaged in triangulation and topographic surveys, and a joint party completed the inspection begun in 1907.

The triangulation and topographic party closed a gap in the boundary triangulation between the line "Whitworth-Glacier", just west of the Skagit River, and International Boundary Monument 31, near Sumas, Washington, and while engaged in this work did some phototopographic work in the valley of the Chilliwack River north of the boundary in the interest of geologic research for the Canadian Government. This party was in the field from May 10 to September 15.

The officers in charge were: Assistant in charge of triangulation, E. T. de Coeli; assistant in charge of topography, Charles Courtman.

The joint inspection party began at Monument 117 on the west bank of Osoyoos Lake, and worked westward to Monument 1 on Point Roberts. A joint report was then submitted to the respective Commissioners to the effect that the boundary was satisfactorily marked. The party was in the field from early in June to October 1st.

The inspecting officers were the same as for 1907: For the United States, C. H. Sinclair; for Canada, Noel J. Ogilvie, D. L. S.

The work of the two parties just described completed the reestablishment and remonumenting of the 49th parallel boundary west of the summit of the Rocky Mountains. The boundary line had now been reestablished, surveyed, monumented, and inspected from the summit of the Rocky Mountains to Georgia Strait. The difficulties had been tremendous. Land and water had done their utmost to impede the progress of the surveyors. Forest fires raging through the mountains had endangered the lives of man and beast. A way had to be hewn through trackless forest; raging floods had to be crossed. Supplies had to be brought to camps over dangerous trails, and monuments and cement packed or hoisted to sharp crags so that the surveyor of the future could take his line from one monument to another. Through it all the surveyors of the two Governments worked separately but in cooperation on terms of friendly comradeship. Every man has reason to review with pride the part he played.

### THE BOUNDARY EAST OF THE SUMMIT OF THE ROCKY MOUNTAINS

Work on the 49th parallel boundary east of the summit of the Rocky Mountains was initiated by a Canadian party. No United States party was engaged

on this part of the boundary in 1908. The Canadian party was, however, accompanied by a representative of the United States.

#### CANADIAN PARTY

To the Canadian party had been assigned the section of the boundary from Coutts, Alberta (Sweetgrass, Montana), eastward to Frenchman Creek. They began work in the vicinity of Coutts, Alberta, at original cairn 356 (now Monument 331), designated in the original report as "Red Creek astronomical station", and worked east for a distance of about 100 miles to original cairn 325 (now Monument 403), originally designated "West Fork astronomical station", at the crossing of Lodge Creek a few miles east of the Alberta-Saskatchewan boundary. The work of the party was as follows:

A base was measured along the railroad track at Coutts and from it a scheme of triangulation was expanded and carried eastward along the boundary for the purpose of controlling the topographic mapping and measurements. The monuments were tied in to the triangulation to later make possible the computation of their geodetic positions. A topographic survey, showing 20-foot contours, was made for a distance of 1 mile on each side of the line throughout the whole distance. Elevations, based on a railroad bench mark at Coutts, were determined by running level lines along the boundary from monument to monument.

The original cairns, after being identified, were connected by surveys which established straight lines between the consecutive marks from which offsets to the curve of the parallel could be made. Sites for additional monuments were selected and marked on the curve of the parallel, and their distances from the original marks were determined either by triangulation or by traverse, as was more practicable. No new monuments were set, owing to the fact that the survey was begun so soon after authorization by the treaty that new monuments (cast-iron) could not be procured in time for installation in connection with the other work.

At the beginning of the season the work of the party was seriously hampered by weather conditions. A violent rain and sleet storm beginning on May 29, and lasting 3 days, flooded the streams, washed out bridges, and damaged or destroyed dwelling houses on the low lands. Traffic was interrupted for 10 days, and but little work could be carried on. The flood was followed by a plague of mosquitoes that made camp life and work in the open an exquisite torture.

The party was in the field from May 10 to September 25.

The personnel of this Canadian party in 1908 was: Chief of party, J. J. McArthur, D. L. S.; assistants, Orville Sills, J. L. Goodwin, J. M. Sheppard, George S. Raley, F. P. Steers, W. B. Cole, E. J. Linegar, O. R. Forsythe, J. M. Perrier, and J. A. Snow; United States representative, F. D. Granger.

#### SEASON OF 1909—FROM THE SUMMIT OF THE ROCKY MOUNTAINS EASTWARD TO FRENCHMAN CREEK

During the season of 1909 the Canadian parties continued to completion the field work on their section of the boundary, from Coutts, Alberta, eastward to Frenchman Creek, on which they had made a good start in 1908. A United States

party began on the 90-mile section of the boundary from the summit of the Rocky Mountains to Coutts.

#### CANADIAN PARTY

The Canadian party reassembled at Coutts, taking up the monumenting which had been necessarily deferred the previous year. The major efforts of the party were directed to that work until all the monuments had been set on the section of the line from Coutts to Lodge Creek.

While the monumenting was going on, all sites for intermediate monuments were rechecked for correct position on the curve of the parallel, and a line of levels was run from Coutts north along the railroad to connect with the irrigation level

lines on Milk River so as to base the boundary levels on a more reliable datum than that of the railway elevations at Coutts used the previous year.



SETTING A CAST-IRON BOUNDARY MONUMENT IN THE PRAIRIE COUNTRY

When the monumenting was completed to Lodge Creek, triangulation, leveling, mapping, and establishing sites for intermediate

monuments on the parallel between original cairns were resumed and closely followed by the monumenting. By the end of the season the objective at original boundary cairn 290 (now Monument 478) on the west side of Frenchman Creek was reached.

The progress of the work throughout the season was very satisfactory. The most serious difficulty met with was the crossing of Milk River. The boundary crosses the stream, in the bottom of a deep canyon, five times in as many miles. The river was in flood, the banks were precipitous, and the bed of the stream a deep quicksand. At the first ford two days were spent in grading the banks and laying a brush mattress over the quicksand. Even after this preparation, several horses narrowly escaped drowning. After this experience the other crossings were avoided by grading a road along the hillside on the north side of the river.

Upon the termination of the field work, all of the party equipment was moved 200 miles eastward along the boundary to Marienthal, Saskatchewan, to be ready for the next season on the second section of the boundary assigned to Canadian parties.

The party was in the field from early in May until November 10.

The party was constituted as follows: Chief of party, J. J. McArthur, D. L. S.; assistants, F. P. Steers, A. C. Young, J. L. Goodwin, J. M. Sheppard, W. B. Cole, G. S. Raley, O. R. Forsythe, J. M. Perrier, J. A. Snow, E. J. Linegar, and E. T. de Coeli; United States representative, F. D. Granger.

## UNITED STATES PARTY

The United States party was organized and equipped at Browning, Montana, some 40 miles by wagon road south of the boundary, and moved to Galbreath's ranch adjoining the boundary about 5 miles east of St. Mary River.

While waiting for snow in the high mountains to melt and consequent high waters in the streams to recede, most of the necessary surveys were made between St. Mary River and the North Fork of Milk River. As the season advanced work was carried westward to the summit of the mountains. The results consisted of the recovery and identification of the original boundary cairns; the running of chords between the original cairns and the establishment of new or intermediate monument sites on the curve of the parallel as determined by offsets from the chords; the development of a scheme of triangulation for the determination of the geographic positions of the monuments and for the horizontal control of the topographic mapping; the running of levels for the vertical control of the mapping; the topographic mapping of the terrain adjacent to the boundary; the cutting of the boundary vista through timber from the summit of the Rocky Mountains for a distance of about 24 miles to the open prairie country; and the setting of the new boundary monuments. By the end of the season all of this had been completed to the North Fork of Milk River, a distance of about 50 miles.

The party was in the field from early in May until the middle of October.

The personnel was as follows: Chiefs of party, E. C. Barnard and C. H. Sinclair; assistants, D. F. C. Moor, E. R. Martin, P. T. Bailey, R. V. Utter, J. S. Siebert, and C. W. Sterling; Canadian representative, M. F. Cochrane, D. L. S.



CHIEF MOUNTAIN, THE MOST EASTERLY PEAK OF THE ROCKY MOUNTAINS IN THE VICINITY OF THE INTERNATIONAL BOUNDARY. IT MARKS AN ANGLE POINT OF THE EASTERN BOUNDARY OF GLACIER NATIONAL PARK



SEASON OF 1910—FROM THE NORTH FORK OF MILK RIVER TO COUTTS, ALBERTA; FROM FRENCHMAN CREEK TO THE MIDDLE FORK OF POPLAR RIVER; AND FROM THE WEST BRANCH OF SHORT CREEK TO THE EAST SLOPE OF THE TURTLE MOUNTAINS

During the season of 1910, field work was carried on by a Canadian party and by a United States party as in the previous year.

CANADIAN PARTY

The Canadian party operated on the second section of the boundary assigned to them, from the West Branch of Short Creek to the west bank of Red River. Work commenced at original mound 219 (now Monument 620) near the West Branch of Short Creek, and during the season was completed eastward about 138 miles to the eastern slope of the Turtle Mountains.

The work of the party, as in the two previous years, included: Recovery and identification of the old cairns and mounds; establishment of additional monument sites on the curve of the parallel between original marks; triangulation and level lines; topographic mapping; the setting of new monuments; and the cutting of a 20-foot boundary vista through the timbered areas of the Turtle Mountains for a distance of about 34 miles.

The survey was completed to original mound 170 (now Monument 718) and remonumenting was completed to original mound 172 (now Monument 714).

The Turtle Mountains comprise an irregular mass of hills rising approximately 500 feet above the surrounding prairie. This difference in altitude is sufficient to cause a precipitation greatly in excess of that of the surrounding country, and sufficient to support forest growth. The depressions among these well-wooded hills and ridges are occupied by numerous swamps and lakes. Throughout this section the original earth mounds marking the boundary were found hidden under a cover of briars, vines, and small saplings. In order to find the mounds it was frequently necessary to run a trial line ahead from the last known mound, cutting a narrow vista through the forest, and measuring the required distance. The difficulties of travel through the brush and timber and the necessity for cutting lines of sight and vista made the progress through this area very slow in comparison with that on the open prairie.

The party was in the field from May 8 to November 7.

The personnel for the season was as follows: Chief of party, J. J. McArthur, D. L. S.; assistants, F. P. Steers, J. M. Sheppard, G. S. Raley, W. B. Cole, E. T. de Coeli, E. J. Linegar, J. M. Perrier, and J. A. Snow; United States representative, F. D. Granger.

UNITED STATES PARTY

The United States party completed the field work begun by them in 1909 on the boundary from the summit of the Rocky Mountains to Coutts, Alberta, where a junction was made with the work previously carried eastward from that point by the Canadian party. The United States party then moved about 200 miles east to original cairn 290 (now Monument 478) on Frenchman Creek and began work on

the second section assigned to them. On this second section they completed the field work from original cairn 290 on Frenchman Creek to original mound 262 (now Monument 530) near the Middle Fork of Poplar River, a distance of about 80 miles.

In general, operations differed in no way from those of 1909, except that in this prairie country no vista had to be cut.

While in other seasons work had been interrupted by an excess of precipitation, in 1910 drouth was the cause of considerable delay. The exceptionally dry season, with only 26 percent of normal precipitation, made the country ready for prairie fires, always annoying and, at times, alarming. The first fire occurred while the party was yet on Frenchman Creek, and, coming from the east, endangered the main camp on Bluff Creek. The fire swept by the Bluff Creek camp, consuming everything in the vicinity. The camp was saved by the determined efforts of the teamsters with the loss of but two tents. Later in the season the work of triangulation was hampered by the smoke from a large fire 350 miles to the westward, and again by the smoke from the forest fire in the Rainy River country, which wiped out the towns of Baudette and Spooner, Minnesota, with a loss of 42 lives.

The prolonged drouth reduced the streams to a series of disconnected pools in which the water was strongly alkaline and unfit for drinking. Drinking water was obtained from holes dug near the pools. The water was thus improved by filtration through the soil, but it was still necessary to sterilize it by boiling.

The season lasted from May 26 to October 24.

The personnel of the United States party was as follows: Chiefs of party, E. C. Barnard and C. H. Sinclair; assistants, James H. Van Wagenen, E. R. Martin, C. W. Sterling, W. R. Winstead, J. S. Siebert, and R. K. Lynt; Canadian representative, T. H. G. Clunn, D. L. S.



FORDING THE SOURIS RIVER NEAR THE INTERNATIONAL BOUNDARY. NOTE THE BAGS ON THE HORSES' NOSES TO PROTECT THEM FROM THE VICIOUS "NOSE FLIES" OF THE PRAIRIES

SEASON OF 1911—FROM THE MIDDLE FORK OF POPLAR RIVER TO  
THE WEST BRANCH OF SHORT CREEK; AND FROM THE EAST  
SLOPE OF THE TURTLE MOUNTAINS TO RED RIVER

CANADIAN PARTY

The Canadian party began operations in 1911 on the east slope of the Turtle Mountains and worked east to Red River, the terminus of this section of boundary allotted to them. This completed the Canadians' share of the survey of the 49th parallel boundary. The work, in addition to the usual survey operations, included the completion of the cutting of the boundary vista on the east slope of the Turtle Mountains and the cutting of vista for 12 miles through the wooded area of the Pembina Mountains.

The season's work covered a part of the section of the boundary where the Commission of 1872-76 had marked the boundary with cast-iron monuments.

These had been placed at intervals of about 1 mile. Eighty-five of the cast-iron monuments (original numbers 70 to 154) were on this section of the boundary. About 27 percent of these monuments were found broken; many of the others were leaning and unstable. The broken ones were replaced by new cast-iron monuments and those in good condition were filled with concrete and reset in concrete bases. No additional or intermediate monuments were interpolated on this part of the line.

The season's work was seriously interfered with in September by an epidemic of typhoid. Fourteen of the party were affected and were sent to the hospital at Morden, Manitoba. Though several were seriously ill, there were fortunately no fatalities.

The party was in the field from April 27 to November 10.

The personnel of the party for the season was: Chief of party, J. J. McArthur, D. L. S.; assistants, J. W. Menzies, D. L. S., F. P. Steers, J. M. Sheppard, G. S. Raley, Charles Courtman, Fred Fulford, E. J. Linegar, J. M. Perrier, and J. A. Snow; United States representative, F. D. Granger.



OBSERVING FROM A BOUNDARY MONUMENT. NOTE  
SPECIAL DEVICE FOR MOUNTING THE THEODOLITE

## UNITED STATES PARTY

The United States party began work in the spring of 1911 at the Middle Fork of Poplar River where they had discontinued work at the close of the season of 1910. All phases of the work were carried on simultaneously as in the past two years. The surveys and monumenting were completed to original mound 219 (now Monument 620), the end of the allotted section of boundary, where a junction was made with the work of the Canadian parties.

In addition to the above, the chief of party in charge of topographic work made a trip west of the summit of the Rocky Mountains and made some additional topographic surveys along the boundary on Point Roberts; between Blaine and Sumas, Washington; in the vicinity of Ferry and Molson, Washington; at Midway and at Myncaster, British Columbia; and at Eastport, Idaho, to bring the maps up to date, more particularly to show the highways and railroads constructed since the boundary surveys had been made.

At the close of the season the camp equipment was moved to Pembina on the Red River to be ready for work east of that point.

The work of this party, like that of the Canadians, was interrupted by sickness. A teamster contracted smallpox. The camp was quarantined and all of the men in camp underwent vaccination. These measures prevented the spread of the disease, but the quarantine and sore arms of the vaccinated delayed work to a considerable extent.

The party was in the field from May 12 to October 14.

The personnel of the party was: Chiefs of party, E. C. Barnard and C. H. Sinclair; assistants, James H. Van Wagenen, E. R. Martin, Jesse Hill, C. W. Sterling, E. V. Perkinson, R. V. Utter, and R. K. Lynt; Canadian representative, George White-Fraser, D. T. S.



A BIT OF OLD EUROPE TRANSPLANTED TO MANITOBA NEAR THE INTERNATIONAL BOUNDARY

SEASON OF 1912—FROM RED RIVER TO LAKE OF THE WOODS; THE MERIDIAN LINE; AND MEASUREMENT OF BASES, ROCKY MOUNTAINS TO LAKE OF THE WOODS

During the season of 1912 the field work on the boundary from Georgia Strait to the Northwesternmost Point of Lake of the Woods was carried on entirely by United States parties.

At the beginning of the season the field work on the boundary from Red River to the Northwesternmost Point of Lake of the Woods, assigned to United States

parties by the Commissioners, still remained to be done. Also, it had been found by office computation that the triangulation from the summit of the Rocky Mountains to Red River needed strengthening by the measurement of additional base lines.

The additional base lines were measured by a special party. They not only measured new bases, but remeasured several bases laid out and measured at the time the triangulation was observed. In all, 15 bases, between the Rocky Mountains and the Red River, were measured and tied in to the triangulation. An additional base was measured near Warroad, Minnesota.

The base-measuring party was in the field from June 1 to August 26.

The section of the boundary from Red River to the Northwesternmost Point of Lake of the Woods, passing through large swampy and timbered areas, presented difficulties in transportation which necessitated changing to some extent the method and procedure used in the open prairie country to the westward.



A TRIANGULATION STATION TOWER ON THE MINNESOTA-MANITOBA BOUNDARY. SUCH TOWERS WERE OFTEN NECESSARY TO SEE OVER THE SURROUNDING FORESTS

Movement by team and wagon along the boundary was impossible in the swamps during the summer season.

Anticipating this difficulty, a small party was sent out early in February to distribute monumenting material across the frozen swamps between Red River and Lake of the Woods. Teams and sleds were used. The cast-iron monuments, sand, and gravel were delivered at the monument sites and piled on rafts, made from poles, to keep them from sinking into the ooze when the swamps thawed. These preparations were finished in March.

The general survey was begun early in May at the Red River where the Canadian party had ended their work in 1911.

Upon entering the timbered swamps a few miles east of Red River, triangulation had to be carried forward from tall towers built so as to see over the tops of the timber. Many of the monuments in this area had to be located by traverse, and a continuous vista had to be cut along the line. Special methods had to be devised for running accurate levels through the swamps and for making accurate topographic surveys. All of the work was very much hampered by the difficulties of transportation and travel. Camp could not be moved along the line but had to be taken north several miles to a branch of the Canadian Northern (now Canadian National) Railway paralleling the boundary, thence eastward on the railroad, thence back to the boundary on some convenient sand ridge extending southward. Before reaching Lake of the Woods horse transportation was abandoned and work done entirely on foot from camps on the railroad, which approaches and crosses the boundary on its route to the south end of the lake. Travel on foot through the swamps was so laborious and disagreeable that only with great difficulty could laborers be kept on the job.

Work on the 49th parallel boundary was completed, with the exception of a small amount of triangulation, on September 17, and the party, with the exception of the triangulation unit, was transferred to the meridian boundary. Launches and small flat-bottomed boats were procured for transportation on Lake of the Woods and for surveying and mapping its shores.

On September 20 the party was in camp on Harrison Creek, Northwest Angle Inlet, at original Monument 2 (now Monument 924).

An immediate start was made on clearing the vista and making a topographic survey along the meridian boundary south from original Monument 1 (now Monu-



A BOUNDARY COMMISSION SURVEY CAMP ON THE PRAIRIE EAST OF RED RIVER, 1912

ment 925) and on making a detailed topographic and hydrographic survey of the upper part of Northwest Angle Inlet from a point southeast of the northernmost monument of the meridian boundary to the Northwesternmost Point of Lake of the Woods.<sup>17</sup> This work was completed as far south as the boundary crossing of Stony Creek by October 14. Weather conditions then became so severe as to prevent further work and the party on the meridian line withdrew from the field. Those engaged in triangulation on the 49th parallel boundary and two topographers mapping the shore line of Lake of the Woods remained in the field for a short time longer, the last leaving early in November.

The personnel of the United States party was: Chiefs of party, C. H. Sinclair, E. C. Barnard, O. B. French; assistants, James H. Van Wagenen, Jesse Hill, H. C. O. Clarke, E. V. Perkinson, R. K. Lynt, F. C. Warner, Hargraves Wood, W. V. Hagar, and E. R. Hand; Canadian representative, J. L. Rannie, D. L. S.

#### SEASON OF 1913—THE MERIDIAN LINE AND THE 49TH PARALLEL NEAR LAKE OF THE WOODS

The season of 1913 marked the conclusion of the field work of reestablishing and remonumenting the boundary from Georgia Strait to the Northwesternmost Point of Lake of the Woods.



BOATS WERE USED FOR TRANSPORTATION ON LAKE OF THE WOODS

As in the previous year, only United States parties were engaged.

The completion of the surveys of the 49th parallel boundary and the meridian line were so planned and arranged that they merged without interruption into the resurvey of the water boundary through Lake of the Woods and to the east.

The marshy character of the entire region along the eastern end of the 49th

parallel boundary and along the meridian boundary made it necessary to do much of the field work early in the season before the swamps thawed and the ice broke up on the lake. Accordingly, work was begun on January 2. A tote-road was opened along the meridian line and the cast-iron monuments, with the sand, gravel, and cement for setting them, were hauled by horse-drawn sleds from Warroad, Minnesota, over the frozen lake and the tote-road to the selected monument sites. Four monuments and the material for setting them were hauled over winter roads to sites on the 49th parallel boundary which had been impossible to reach with wagons the previous year.

<sup>17</sup> See Commissioners' "Joint Report upon the Survey and Demarcation of the Boundary between the United States and Canada from the Northwesternmost Point of Lake of the Woods to Lake Superior", pages 39 to 41.



After the monumenting material had been delivered, and before the break-up of the ice, the boundary vista on the meridian line was completed southward to Lake of the Woods; the southern intersection of the meridian boundary with the boundary in the channel of the Northwest Angle Inlet was located and temporarily marked on the ice; marks on the shores for permanent reference were established; and a precise invar tape traverse was made of the meridian boundary. As the advance of spring weather permitted, monuments were set and the topography and triangulation were completed. This virtually completed the field work on the International Boundary from Georgia Strait to the Northwesternmost Point of Lake of the Woods. The last of the work was completed by May 1 and the parties engaged upon it were then merged with the organization for the survey of the water boundary to the east.

The personnel of the parties on the 49th parallel and the meridian boundaries was: Chiefs of party, E. C. Barnard, C. H. Sinclair; assistants, James H. Van Wagenen, Jesse Hill, E. R. Martin, H. C. O. Clarke, E. V. Perkinson, and R. K. Lynt.

#### SEASON OF 1914—NUMBERING THE MONUMENTS

It was not possible to place final numbers on the boundary monuments when they were set, for the reason that two independent parties were engaged at the same time in setting them on different sections of the line and neither party knew how many monuments were being placed by the other. Marking the numbers on the monuments was done in 1914. A party of three men with a camp wagon and an extra saddle horse started at the summit of the Rocky Mountains and worked eastward numbering the monuments as they went until the swamp country east of Red River was reached on November 7. The swamps were found so flooded by recent heavy rains that travel along the boundary was impossible. The party suspended operations and waited until the "freeze-up", when work was resumed and carried forward to the Northwesternmost Point of Lake of the Woods. All of the monuments, from number 272 on the summit of the Rocky Mountains to number 925, the most northern monument on the meridian line, were found in good condition with but one exception—Monument 906. This monument, standing in an open swamp, was found to be tilted a few inches from the perpendicular either from settling or from the action of frost. It was restored to its original perpendicular position and a load of rocks placed around the base for reinforcement. Monuments 911 and 912, in similar locations, were reinforced in like manner.

In addition to marking the monuments, the party did some triangulation on the eastern slope of the Rocky Mountains to more accurately determine the geographic positions of several boundary monuments. They also made remeasurements of a few distances between monuments on the eastern section of the 49th parallel boundary.

Work started June 6 and ended on December 14.

The engineer in charge was E. R. Martin.



## SEASONS OF 1917 TO 1922—COMPLETION OF FIELD OPERATIONS UNDER THE PROVISIONS OF THE TREATY OF 1908

Although the reestablishment of the boundary line from the Gulf of Georgia (Georgia Strait) to the Northwesternmost Point of Lake of the Woods was virtually completed with the inspection and numbering of the monuments in 1914, office computations later showed the need of some additional surveys and inspections. The computations of geographic positions of monuments indicated that some of the monuments east of the summit of the Rocky Mountains, interpolated between original boundary marks, were not located as accurately on the curve of the parallel as seemed desirable to the Commissioners. The data for computing the geographic positions of the monuments were found to be inadequate in some instances. Certain checks on levels and on topography were required to assure the accuracy of the topographic maps.

Accordingly, small United States parties in 1917, 1918, 1919, and 1921 covered the greater part of the 49th parallel boundary east of the summit of the Rocky Mountains, making inspections, checks, and additional surveys, and moving a few monuments found to be slightly off line. In 1922 a joint United States and Canadian party did some additional work west of the summit of the Rocky Mountains.

The party of 1917 made an inspection of and perfected surveys of the boundary from Monument 333 at Sweetgrass, Montana, (Coumts, Alberta) to Monument 482 in the valley of Frenchman Creek and an inspection of Monuments 499 to 507.

From Monument 333 to Monument 482 a continuous transit-and-tape traverse was run from monument to monument and connected with the boundary triangulation at frequent intervals. The traverse also included the location of all road and stream crossings of the boundary and the location of all United States and Canadian section corner marks found on the line.

A stadia profile of the boundary line between monuments was run and vertical angles were observed between the monuments to check elevations. Several errors in the longitude of monuments were found, and three interpolated monuments, numbers 398, 400, and 481, were found to be several feet off the curve of the parallel between original boundary marks.

East of Frenchman Creek the examination of Monuments 499 to 507 showed that some error existed in the original triangulation by which the geographic positions of the monuments had been determined and that observations were needed to correct the errors. Attending circumstances, however, prevented the work from being done at the time.

During the season of 1918, the party continued the work begun the year before. Beginning at Monument 535, they worked west to Monument 481, checking the locations of all of the monuments interpolated on the curve of the parallel between original boundary marks and making additional observations to correct several errors in their geographic positions. Monument 481, found in 1917 to be set south of the parallel, was moved to its proper place on the curve. Monuments 398 and 400, likewise found to be off the true boundary, were moved to their correct positions by a Canadian engineer.

Upon the completion of the work at Monument 481 in the valley of Frenchman Creek the party moved eastward to Monument 621 near the West Branch of Short Creek and from there carried work eastward to Monument 722, just east of the Turtle Mountains.

On the last section of the line the party checked the locations of the monuments on the curve of the parallel between original boundary marks; ran transit-and-tape traverse lines; did such triangulation as was necessary to tie all of the monuments to the triangulation; determined the elevations of boundary Monuments 694 to 720, in the Turtle Mountains, by running a line of levels along the boundary from a Geodetic Survey of Canada precise-level bench mark at Monument 693 to a like bench mark at Monument 721; and made an inspection of the topography of the boundary maps.

During the season of 1919 the party carried on similar work from Monument 721 to Monument 832 on the west bank of Red River, moved two monuments, numbers 723 and 741, found to be several feet off the curve of the parallel between original boundary marks, and permanently marked a large number of boundary triangulation stations between Portal, North Dakota, and Red River in order to preserve the stations for future use.

In 1921 the party covered the section of boundary from Monument 334 at Sweet-grass-Coutts to Monument 272 on the summit of the Rocky Mountains.

On this section of the boundary, the locations of the monuments interpolated on the curve of the parallel between original boundary marks were checked. Several monuments were found to be incorrectly located and were moved to their true positions; necessary repairs were made to a number of monuments; and the triangulation for determining the geographic positions of the monuments was strengthened in many places by additional observations.

The party personnel for these four years was as follows: Chief of party, J. G. Hefty; assistant in 1919, R. K. Lynt; assistant in 1921, E. R. Martin.

In 1922 a joint United States and Canadian party recleared the boundary vista from Monument 1 on Point Roberts to Monument 43 at the base of the Cascade Mountains; repaired or rebuilt 16 badly damaged monuments; established two new monuments, Monument 5-A<sup>18</sup> and Monument 19-A, at two important highway crossings; ran a transit-and-tape traverse from monument to monument along the



A BOUNDARY LINE STATION ON A CEDAR STUMP  
BETWEEN MONUMENTS 6 AND 7

<sup>18</sup> Monument 5-A has since been replaced by a pair of monuments of different design, see p. 112.

boundary from Monument 1 to Monument 4 and from Monument 5 to Monument 43; and did the necessary triangulation to tie the traverse lines to the boundary triangulation and to the first-order triangulation of the Geodetic Survey of Canada.

The party also recleared the boundary vista across the valley of the Similkameen River, across the valley of the Kettle River at Laurier, Washington, across the valley of the Kootenai River at Porthill, Idaho; and across the valley of the Kootenai River at Gateway, Montana.

No further field work was done on the boundary from Georgia Strait to the Northwesternmost Point of Lake of the Woods until maintenance was taken up under the provisions of the treaty of 1925.

The personnel of the joint party in 1922 was: Chief of party for Canada, J. N. Ingersoll; chief of party for the United States, J. G. Hefty.

#### SEASON OF 1926 AND SUBSEQUENT THERETO—MAINTENANCE UNDER THE TREATY OF 1925

After the adoption of the treaty of 1925, maintenance on the boundary under the provisions of that treaty was carried on by the Commissioners at various places from Georgia Strait to the Northwesternmost Point of Lake of the Woods in the years 1926, 1928, and in each year thereafter.

In conjunction with maintenance, necessary triangulation was done west of the summit of the Rocky Mountains to complete the determination of geodetic positions of boundary monuments in accordance with the agreement of the Commissioners.<sup>19</sup>

In June 1926, at the request of the International Lions Clubs of Winnipeg, Manitoba, and Grand Forks, North Dakota, the Commissioners located a new boundary monument site in the vicinity of Emerson, Manitoba, on the west side of the highway west of Red River, leading from Grand Forks, North Dakota, to Winnipeg, Manitoba. This was done in accordance with article II of the treaty of 1925, on the straight-line course between Monument 832 and Monument 833. The International Lions Clubs erected the monument as a token of international good will and amity. The Commissioners approved the design and designated the monument "832-A."<sup>20</sup>

In 1928 the Commissioners carried on maintenance work on the boundary from the west shore of Point Roberts on Georgia Strait to the foot of the Cascade Mountains, and from Red River to Northwest Angle Inlet of Lake of the Woods.

On the west shore of Point Roberts two large range marks were erected to range the 49th parallel water boundary, a monument was erected to mark the terminus of the 49th parallel land boundary at high water mark, and Monument 1, the large stone monument on Point Roberts, was repaired by repointing the joints with cement mortar. From Monument 1 to Monument 39 the vista was again recleared through all forest areas and the monuments were inspected.

From Red River to Northwest Angle Inlet, Monuments 833 to 925 were inspected and those found damaged, 24 in number, were repaired; and the vista was recleared through all forest and brush-grown areas.

<sup>19</sup> See p. 27.

<sup>20</sup> This monument was moved in 1929, see p. 107.

In 1929 the Commissioners established four new monuments on the 49th parallel boundary to mark the crossings of two important highways and moved one monument to a new site.

Two of the new monuments were set at Wild Horse, Alberta, to mark the crossing of the highway running from Havre, Montana, to Medicine Hat, Alberta. They were set on the straight-line course between Monument 388 and Monument 389, and were numbered 388-A and 388-B. The other two new monuments were set near Emerson, Manitoba, to mark the crossing of the main highway from Minneapolis, Minnesota, to Winnipeg, Manitoba. They were set, one on each side of the highway, on the straight-line course between Monuments 833 and 834 and were numbered 833-A and 833-B. The new monuments are of ornamental concrete of a special design adopted by the Commissioners for marking the boundary crossings of important international highways on all sections of the boundary.

Monument 832-A, the Lions Clubs monument set in 1926, was moved about 500 feet west and again set on the straight-line course of the boundary between Monuments 832 and 833. The reason for moving the monument was that the highway had been relocated 500 feet farther west and the monument was accordingly moved to the west side of the new location. The setting and moving of these monuments included the necessary surveys for determining their geographic positions.

In 1930 the Commissioners carried on maintenance work along the 49th parallel boundary from Monument 108, just west of the Similkameen River, to Monument 169, a few miles east of the eastern crossing of the Kettle River, and at several intervals eastward to the eastern crossing of the Kootenai River at Gateway, Montana.

In the course of this maintenance work all of the monuments from Monument 108 to Monument 169, and Monuments 179, 180, 181, 206, 207, 208, 243, 244, and 245, the geographic positions of which had never been accurately determined, were connected by triangulation with the boundary triangulation scheme and it in turn was connected in several places with the first-order triangulation of the United States Coast and Geodetic Survey and the Geodetic Survey of Canada, thus making it possible to accurately compute the geographic positions of all these monuments on the North American datum of 1927.

Two new monuments of the standard ornamental concrete type were set to mark the boundary crossing of the Wenatchee-Penticton highway in the Okanogan Valley. These new monuments were set, one on each side of the highway, on the straight-line course of the boundary between Monument 116 and Monument 117 on the west side of Osoyoos Lake. They were numbered 116-A and 116-B. The boundary vista was recleared at several minor road and stream crossings where the original vista was so overgrown that the line could no longer be identified without resorting to surveys. About 8 miles of vista was recleared.

In 1931 the Commissioners established four new monuments on the 49th parallel boundary to mark the boundary crossing of two important international highways and determined the geographic positions of several boundary monuments on the North American datum of 1927.

Two of the new monuments were set to mark the boundary crossing of the main highway from Browning and Glacier Park, Montana, to Cardston and to Waterton

Lakes Park, Alberta. These monuments were set, one on each side of the highway, on the straight-line course of the boundary between Monument 190 and Monument 191. The monuments were numbered 190-A and 190-B.

The other two new monuments established in 1931 were set to mark the boundary crossing of the highway from Northport, Washington, to Rossland, British Columbia. They were set, one on each side of the highway, on the straight-line course between Monument 174 and Monument 175. The new monuments were numbered 174-A and 174-B. In connection with the surveys for determining the geographic positions of Monuments 174-A and 174-B on the North American datum of 1927, the geographic positions of Monuments 174, 175, and 176, which had never been accurately determined, were connected to the same datum.

In 1932 the Commissioners did maintenance work on the 49th parallel boundary at the following places: In the valley of Kettle River between Monuments 165 and 166; in the valley of Clark Fork River (Pend-d'Oreille) between Monuments 187 and 190; in the valley of the east crossing of the Kootenai River from Monument 246 to Monument 248; through the Turtle Mountains from Monument 696 to Monument 720; and through the Pembina Mountains from Monument 784 to Monument 796.

In the Kettle River Valley two new monuments were erected to mark the boundary crossing of the Kettle River Valley highway at Laurier, Washington. These monuments were placed, one on each side of the highway, on the straight-line course between Monument 165 and Monument 166. The new monuments were numbered 165-A and 165-B.

In the valley of the Clark Fork River (Pend-d'Oreille) two new monuments were established to mark the boundary crossing of the Spokane-Nelson highway at the Canadian Customs port of Nelway. These monuments were set, one on each side of the highway, on the straight-line course between Monument 188 and Monument 189. These new monuments were numbered 188-A and 188-B. In connection with the geodetic surveys necessary to determine the geographic positions of Monuments 188-A and 188-B, the geographic positions of Monuments 188, 189, and 190, which had not before been accurately determined, were redetermined. Monument 187 and Monument 190, found with broken shafts, were repaired.

In the valley of the east crossing of the Kootenai River near Gateway, Montana, geodetic surveys were made to accurately determine the geographic positions, on the North American datum of 1927, of Monuments 246, 247, and 248, the positions of which had not before been accurately determined.

Through the Turtle Mountains from Monument 696 to Monument 720 the boundary vista was recleared through all timbered and brush-grown areas and two new boundary monuments were placed on the line. The two new monuments were established to mark the boundary crossing of the Canal-to-Canada Highway at the east entrance of the International Peace Garden. These monuments were set, one on each side of the highway, on the straight-line course between Monuments 711 and 712, and were numbered 711-A and 711-B.

Through the Pembina Mountains from Monument 784 to Monument 796 the vista was recleared.

In 1933, field work, including maintenance work and additional triangulation, was carried on by the Commissioners west of the summit of the Rocky Mountains, between the States of Washington and Montana and the Province of British Columbia.

On the Washington-British Columbia boundary, the work covered a 36-mile section from Monument 165, at Laurier, Washington, to Monument 184, on the summit of the ridge between the Columbia River and Clark Fork (Pend-d'Oreille) River, and a 27-mile section from Monument 5, at Blaine, Washington, east to Monument 39, at the foot of Vedder Mountain near Sumas, Washington. It also included geodetic surveys on Boundary Bay to determine the locations of sites for marks to be erected to range the course of the boundary across Boundary Bay.

On the 36-mile section of the line from Monument 165 to Monument 184 the boundary vista was recut, the monuments were inspected, and those found damaged were repaired. All monuments whose geodetic positions had not previously been determined were tied by triangulation to the first-order triangulation of the United States Coast and Geodetic Survey and the Geodetic Survey of Canada. A Canadian party was engaged on this work from July 14 to November 13.

On the 27-mile section from Monument 5 to Monument 39 the boundary vista was recleared and the monuments were inspected. The monuments required no repairs. This work was done by a Canadian party during the period August 11 to October 24.

On Boundary Bay surveys were made for locating sites for a pair of range marks to be erected on the east side of the bay to range the boundary westward across the bay. The work was done by an engineer of the United States section of the Commission. It was begun in December and finished early the following year.

On the Montana-British Columbia boundary the work covered the 43-mile section of the line from Monument 248, a short distance east of Gateway, Montana, to Monument 272 at the summit of the Rocky Mountains. Here the vista was recut from Monument 252 to Monument 272; all of the boundary monuments were inspected and those found damaged were repaired. The geographic positions of all the monuments were determined by triangulation, connecting them with the existing schemes of triangulation paralleling the boundary. This work was carried out by two United States parties between June 15 and October 28.



TRIANGULATION SIGNAL ON A MOUNTAIN SUMMIT  
WHERE MATERIAL WAS SCARCE

In 1934 maintenance and additional geodetic work were carried over approximately 130 miles of the 49th parallel boundary. The sections of line covered in this season were: From Monument 206, near the west crossing of the Kootenai River, to Monument 252, a few miles east of the east crossing of the Kootenai River; from Monument 184, between the Columbia River and Clark Fork (Pend-d'Oreille) River, to Monument 206; and the short piece of the line in the vicinity of Point Roberts and Blaine, Washington.

On the boundary from Monument 206 to Monument 252, the vista was re-cleared from Monument 239 to Monument 252 and across the valley of the Moyie River.

The monuments were inspected and repaired from Monument 206 to Monument 252, and the geodetic positions of all monuments from Monument 206 eastward which had not been determined previously were connected by triangulation with the existing schemes paralleling the boundary. This work was done by United States parties during the period May 30 to October 23.

On the boundary from Monument 184 to Monument 206, the vista was re-cleared from Monument 184 to Monument 199; the monuments were inspected and repaired from Monument 184 to Monument 206, and the geodetic positions of all monuments from 184 to 206 not previously determined were connected with the existing schemes of triangulation paralleling the boundary. This work was done by a Canadian party during the period May 15 to October 23.

In the vicinity of Point Roberts and Blaine, Washington, a Canadian party re-cleared the vista and inspected the monuments across Point Roberts. The United States engineer who in December 1933 had begun surveys to locate sites for range marks, carried a scheme of triangulation across Boundary Bay from first-order



LOCATING A RANGE MARK SITE IN BOUNDARY BAY, OFF BLAINE, WASHINGTON

stations of the Geodetic Survey of Canada to accurately determine the geodetic positions of the range mark sites and the boundary monuments on each side of the bay.

Early in the year the two range marks<sup>21</sup> on the east side of Boundary Bay were built by contract, after competitive bidding, under the supervision of the United States Lighthouse Service.

<sup>21</sup> For description of range marks see p. 124.



In 1935 maintenance and geodetic work on the 49th parallel boundary were confined to the section of the line which crosses the Cascade Mountains, where no inspection or maintenance work had been done since the completion of the resurvey and demarcation in 1908, and to the western section of the line in the vicinity of Point Roberts and Blaine, Washington, where frequent and conspicuous boundary marks are needed to meet the requirements of heavy traffic crossing the border.

United States parties covered the 60-mile section of line between the Skagit and Similkameen Rivers. They inspected Monuments 73 to 108 and found them all in good condition, recleared the boundary vista where urgently needed, and determined the geodetic positions of Monuments 73 to 108 by triangulation based on the existing schemes of triangulation paralleling the boundary. The parties were in the field from June 10 to October 1.

Canadian parties covered the 50-mile section of line between Vedder Mountain, of the west foothills of the Cascade Range, to the valley of the Skagit River. They recleared the boundary vista across the summits of the timbered ridges marked by monuments, inspected and repaired as needed, Monuments 41 to 73, and determined the geodetic positions of Monuments 41 to 72 by triangulation based on the existing schemes of triangulation paralleling the boundary. The parties were in the field from May 15 to October 1.

On the western section of the line two range marks were built on Boundary Bay and several new monuments were established at highway crossings. This work was all carried out under the supervision of Canadian engineers.

The two range marks<sup>22</sup> were erected on the west side of Boundary Bay to supplement the pair erected on the east side of the bay in 1934 to range the 12-mile course of the boundary across the bay. They were erected early in the spring of

<sup>22</sup> For description of range marks see p. 124.



A BOUNDARY COMMISSION SURVEY CAMP IN THE CASCADE MOUNTAINS DURING A SUMMER SNOWSTORM  
122824°—37—9



1935. The work was done by a Canadian firm under contract let through competitive bidding, and was supervised by the Canadian Department of Public Works.

New highway monuments were established in the autumn of 1935 by a Canadian engineer. Two new monuments were set between Monuments 2 and 3 to mark the boundary crossing of the highway from Ladner, British Columbia, to the village of Point Roberts, Washington. These monuments were of the ornamental concrete type used to mark highway crossings. They were set on the boundary, one on each side of the highway, and were numbered 2-A and 2-B.

Two new monuments were set between Monuments 3 and 4 to mark the boundary crossing of the highway from Ladner, British Columbia, where it enters the village of Boundary Bay, Washington. These monuments were of the ornamental concrete type used to mark highway crossings. They were set on the boundary, one on each side of the highway, and were numbered 3-A and 3-B.

One new monument was set and one intermediate monument was replaced between Monuments 5 and 6 to mark the boundary crossing of the east highway from Blaine, Washington, to New Westminster and other cities and towns in British Columbia. This highway crossing of the boundary had been marked by a single concrete monument of individual design numbered 5-A, set on the west side of the road in 1922. The monument was removed and was replaced by an ornamental concrete monument of the type now used at highway crossings. A like monument was set on the boundary on the east side of the highway. These monuments were numbered 5-E and 5-F, leaving the letters A, B, C, D for probable future use between these monuments and Monument 5.

Two new monuments were set between Monuments 31 and 32 to mark the boundary crossing on the main street between the towns of Huntingdon, British Columbia, and Sumas, Washington. These monuments had to be set within the traveled way of side streets, which necessitated the use of a surface type of monument. They are concrete piers set with their top surfaces flush with the street. In the center of the surface of each pier, a 3-inch bronze disk is sunk, on which the exact boundary is marked by a line; and stamped on the appropriate sides of the line are the words "UNITED STATES" and "CANADA."

In 1936 maintenance work on the 49th parallel boundary was carried on west of the summit of the Rocky Mountains by United States and by Canadian parties.

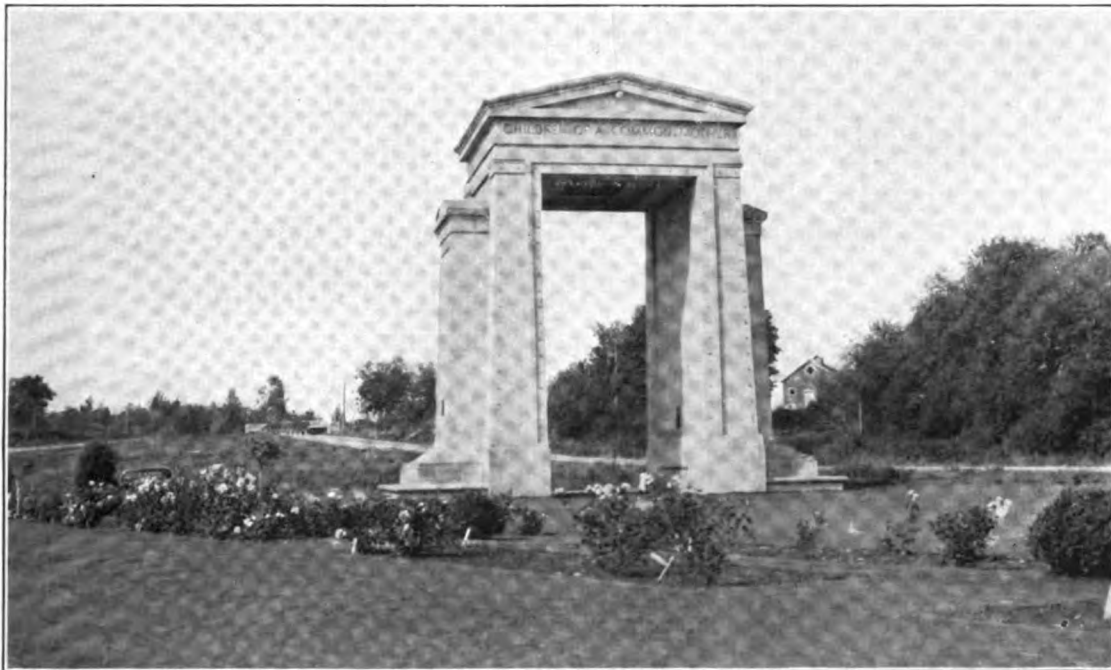
The United States parties recleared the boundary vista through all timbered areas from Monument 199 to Monument 239, amounting to approximately 62 miles of the 67 miles between these two monuments. They also set two new monuments at Eastport, Idaho—Kingsgate, British Columbia, to mark the boundary at the crossing of the highway which runs from Bonners Ferry, Idaho, to Cranbrook, British Columbia. These monuments were of the ornamental concrete type used to mark highway crossings. They were set on the boundary, one on each side of the highway, and were numbered 216-A and 216-B.

The Canadian parties were engaged on the section of the boundary from Monument 5 at Blaine, Washington, to Monument 73 just east of the Skagit River. They recut the boundary vista through all timbered areas from Monument 41 to Monument 73, amounting to approximately 35 miles of the 50 miles between the two monuments. The Canadian parties also set 5 new monuments. They set a

monument of the conical bronze type at a point that had originally been selected as the site for Monument 45, but at which a monument had not heretofore been set. This new monument was numbered 45, and the monument originally set  $\frac{1}{3}$  mile to the westward and numbered 45 was renumbered 44-A. At Blaine, Washington, they set 4 new monuments to mark the boundary at the crossing of the Pacific Highway. Two of these four were set on the boundary, one on each side of the roadway passing the west side of the Peace Portal, and two were set on the boundary, one on each side of the roadway passing the east side of the Peace Portal. These monuments were of the ornamental concrete type used to mark highway crossings. They were numbered, from west to east, 5-A, 5-B, 5-C, and 5-D.

The field work of 1930 to 1936, inclusive, covered the entire section of the boundary west of the Rocky Mountains. During this 7-year period all of the boundary monuments were inspected and many repairs made; a large portion of the vista was recut; new monuments were set; and the work of determining the geodetic positions of all of the monuments was completed, making it now possible to describe the entire boundary from Georgia Strait to the Northwesternmost Point of Lake of the Woods in terms of geodetic positions as other sections of the boundary have been described in the reports of the Commissioners.

All of the field work subsequent to 1925, described in the foregoing paragraphs, has been reported upon in detail in the several annual joint reports of the Commissioners upon maintenance work submitted by them in duplicate to their respective Governments in accordance with the provisions of article IV of the treaty of 1925



THE PEACE PORTAL; ON THE INTERNATIONAL BOUNDARY AT THE CROSSING OF THE PACIFIC HIGHWAY ON THE EAST SHORE OF BOUNDARY BAY AT THE NORTH LIMITS OF BLAINE, WASHINGTON; ERECTED BY THE PACIFIC HIGHWAY ASSOCIATION UNDER THE DIRECTION OF THE LATE SAMUEL W. HILL. THE MONUMENT IS IN COMMEMORATION OF THE TREATY OF GHENT, SIGNED DECEMBER 24, 1814, SINCE WHICH TIME PEACE HAS BEEN KEPT BETWEEN THE TWO NATIONS WITHOUT ARMED FORCES OR FORTIFICATIONS ALONG THEIR COMMON BORDER. THE MONUMENT WAS BEGUN IN 1914 AND WAS COMPLETED AND DEDICATED IN 1921

## FIELD AND OFFICE METHODS AND RESULTS

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### HORIZONTAL CONTROL

The horizontal control for the topographic surveys and for the determination of the geographic positions of the monuments marking the boundary line from the shore of Georgia Strait to the Northwesternmost Point of Lake of the Woods consists of a belt of major triangulation supplemented by schemes of minor triangulation and traverse. This belt of triangulation and traverse is controlled by the arc of first-order triangulation and traverse of the United States Coast and Geodetic Survey and the Geodetic Survey of Canada extending along the International Boundary from the Pacific Ocean to Lake Superior.

The general plan of control is shown on the 30 triangulation sketches on pages 428 to 457 of appendix V.

The geographic positions and descriptions of the triangulation and traverse stations are listed in appendix V pages 254 to 427.

The first-order control is an arc of the western net of first-order triangulation, readjusted by the United States Coast and Geodetic Survey to establish the North American geodetic datum of 1927.

The major triangulation of the boundary survey is an almost continuous belt of triangulation paralleling or straddling the boundary from Point Roberts to Lake of the Woods. It has been tied in, frequently, to the stations of the first-order control so as to permit of a rigid adjustment therein. The tie points to the first-order triangulation are plainly indicated as such in the lists of geodetic positions and on the triangulation sketches to be found in appendix V.

Inside of the major scheme, and controlled by it, are the minor schemes of triangulation and traverse used to locate the boundary monuments.

West of the summit of the Rocky Mountains the extremely tall and heavy growth of forests, the deep valleys, and the precipitous mountain ranges often made it extremely difficult to locate the monuments by triangulation. Consequently when the line was first reestablished and remonumented in 1903 to 1907 many of the monuments were omitted from the triangulation scheme. The distances between these monuments were determined at that time only by chaining or by stadia measurements of a comparatively low order of accuracy. Since that time the geographic positions of all these monuments have been determined by triangulation or by accurate traverse. This work has been done in conjunction with maintenance work under the treaty of 1925 and was completed in 1936.

The horizontal control of the Lake of the Woods region consists of an auxiliary scheme of first-order triangulation, tied to the first-order traverse at Warroad, Minnesota, extending over the southern part of Lake of the Woods; a minor scheme

of triangulation extending from this first-order scheme to Northwest Angle Inlet; and an invar tape traverse run along the meridian boundary from Northwest Angle Inlet to Buffalo Bay where it completes a circuit by a tie to the first-order triangulation.\* The geographic positions of the monuments on the meridian line are determined by the invar tape traverse.

The methods used both in the field work and in the office computations of the horizontal control follow in general the standardized methods of the United States Coast and Geodetic Survey and the Geodetic Survey of Canada for work of comparable character.

## MONUMENTS AND MONUMENTING

The International Boundary from the Gulf of Georgia (Georgia Strait) to the Northwesternmost Point of Lake of the Woods is marked by 959 monuments set on the boundary line, 2 reference monuments referencing the Northwesternmost Point of Lake of the Woods, and 4 range marks ranging the boundary across Boundary Bay between Monuments 4 and 5. The monuments have been interspaced so as to make the demarcation of the line as effective as possible. They are placed on heights of land, at crossings of prominent streams, at convenient intervals on the level plains, and at crossings of important international highways.

Wherever possible—and it is so in the majority of instances—the monuments are so placed as to be consecutively intervisible. Nine hundred and twenty-six of the boundary monuments bear the consecutive numbers from 0 to 925, Monument 0 being the initial monument on the eastern shore of Georgia Strait and Monument 925 being the most northern monument on the meridian boundary and the first one south of the Northwesternmost Point of Lake of the Woods. The other 33 boundary monuments established subsequent to 1907 are designated by letters combined with the number of the consecutively numbered monument just preceding, as for example, 116-A, 116-B.

### TYPES OF MONUMENTS

The monuments which mark and reference the boundary are of the following 11 types:

1. General type of cast-iron monument made in 1872-76 and in 1908-13. (Fig. 1.)
2. General type of aluminum-bronze monument made and set in 1904-9. (Fig. 2.)
3. General type of concrete monument for marking highway crossings. (Fig. 3.)
4. Special granite monument erected in 1861. (Fig. 4.)
5. Special concrete monument with bronze post. (Fig. 5.)
6. Shore range-mark tower. (Fig. 6.)
7. Offshore range-mark tower. (Fig. 7.)

\*For complete data, horizontal control of the Lake of the Woods region, see the Commissioners' Joint Report upon the Survey and Demarcation of the Boundary between the United States and Canada from the Northwesternmost Point of Lake of the Woods to Lake Superior, 1931, appendix V, and accompanying triangulation sketches.

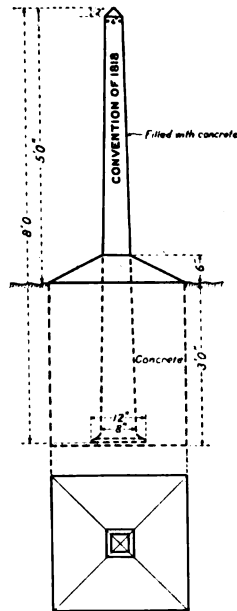


Fig. 1. - General type  
cast-iron monument

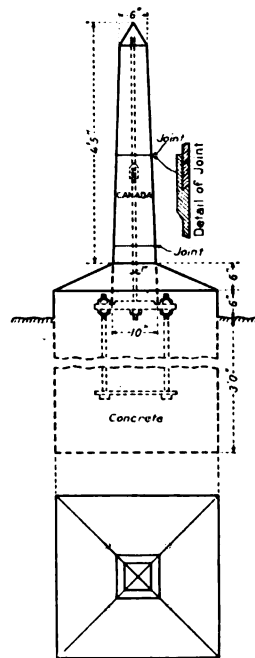


Fig. 2. - General type aluminum-  
bronze monument

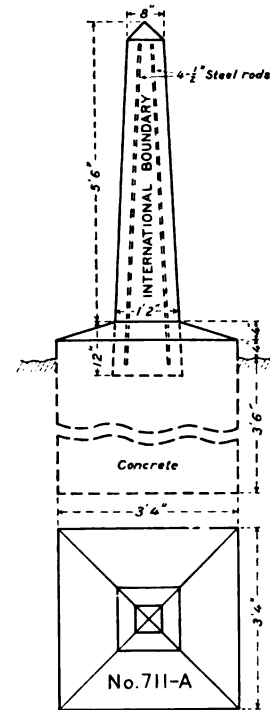


Fig. 3. - General type concrete  
monument for highway crossings

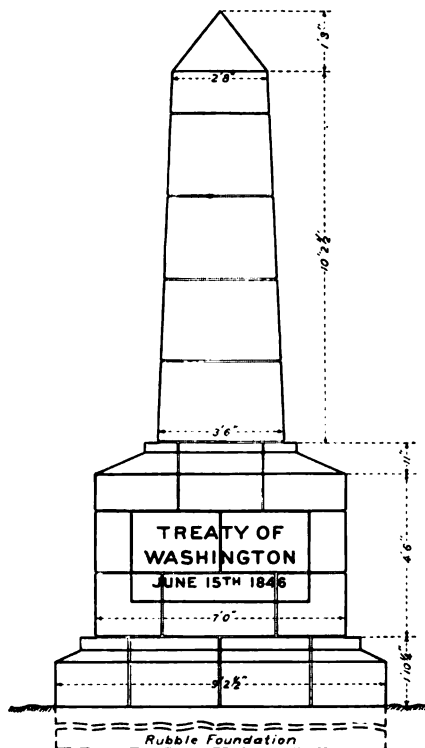


Fig. 4. - Special granite monument erected 1861

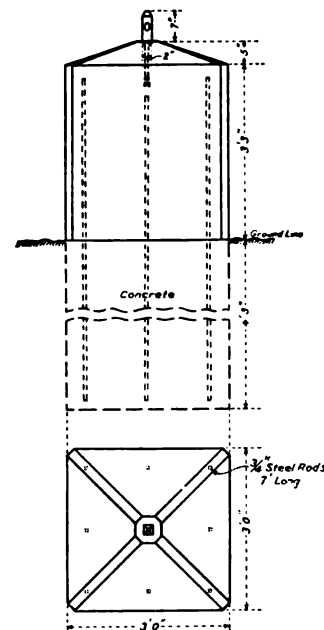


Fig. 5. - Special concrete monument, with bronze post

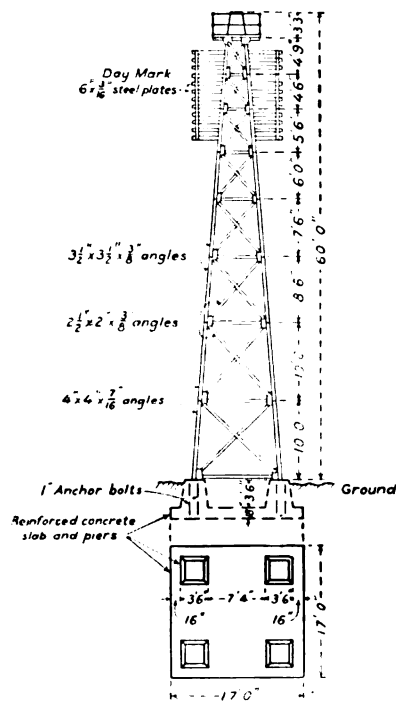


Fig. 6. - Shore range-mark tower

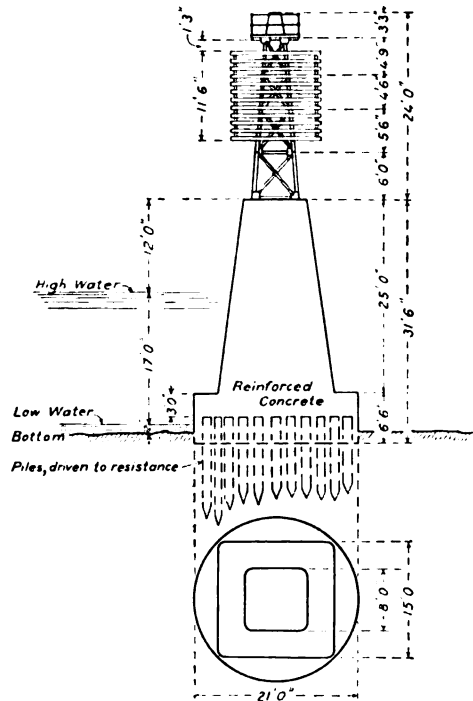


Fig. 7. - Offshore range-mark tower

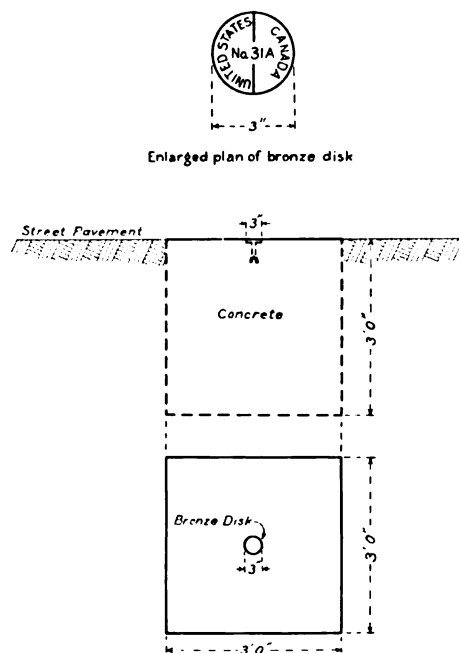


Fig. 8. - Special concrete monument, with bronze disk

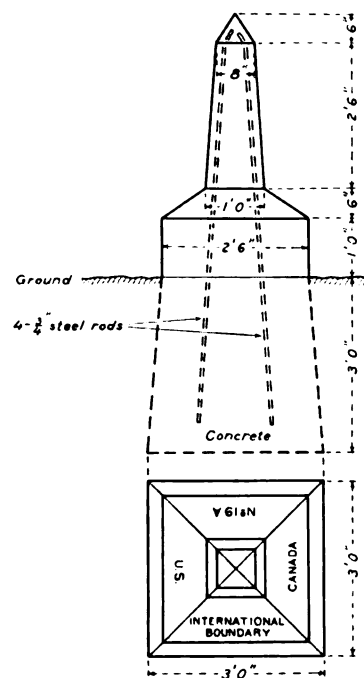
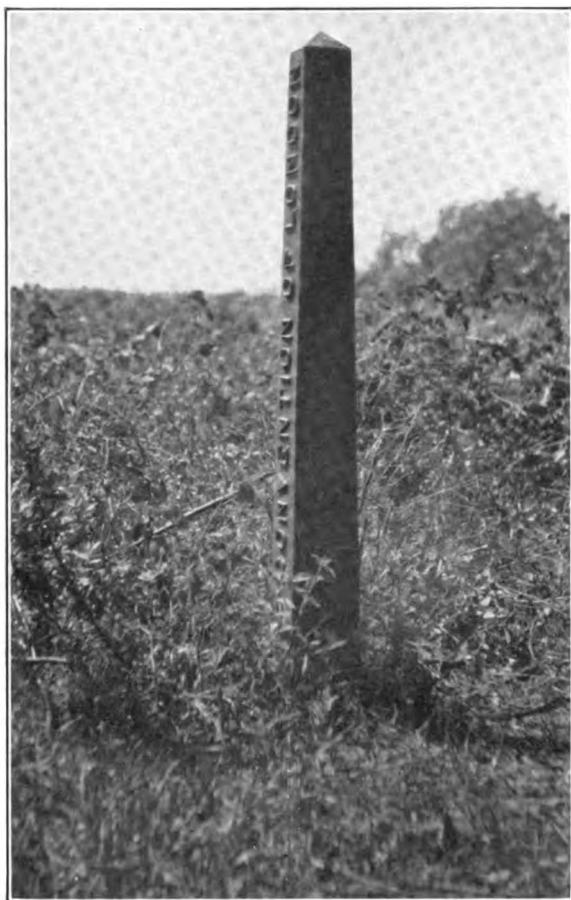


Fig. 9. - Special concrete monument, inscription on base



ORIGINAL MONUMENT 53, NOW REPLACED BY MONUMENT 849, ONE OF THE CAST-IRON MONUMENTS SET IN THE RED RIVER VALLEY BY THE COMMISSION OF 1872-76. PHOTOGRAPHED IN 1912

8. Special concrete monument with bronze disk, for surface mark. (Fig. 8.)
9. Special concrete monument with inscriptions on base. (Fig. 9.)
10. Special conical bronze monument.
11. Special concrete monument, Lions Clubs. (Photograph on p. 125.)

The general type of cast-iron monument of 1872-76 and 1908-13, shown in figure 1, page 116, though of uniform exterior dimensions, differs somewhat in detail. Those of both dates are hollow iron castings in the form of a truncated pyramid 8 feet high, 8 inches square at the bottom, 4 inches square at the top, with a solid pyramidal cap, and a heavy flange at the bottom.

The monuments of 1872-76 have sharp, square corners; the thickness of the metal in the shaft is  $\frac{3}{8}$  inch; the flange at the bottom is octagonal and is 1 inch thick; the average weight is 285 pounds. Upon opposite faces—the south and the north—are cast, in raised letters

2 inches high, the inscriptions "CONVENTION OF LONDON" and "OCTOBER 20, 1818", the inscriptions beginning about  $4\frac{1}{2}$  feet above the bottom and reading upward.

These monuments had been set along the southern boundary of Manitoba by the Commission of 1872-76. Eighty-five of these, corresponding to the present numbering 748 to 832, were set west of Red River. About 60 were found to be in good condition in 1911. They were filled with concrete and reset in concrete bases with the top of the obelisk 5 feet above the ground. The broken ones and also those that had originally been set east of Red River were destroyed and replaced by new cast-iron monuments of the style made in 1908-13.

The monuments cast in 1908-13, while of the same external dimensions as those of 1872-76, have the corners slightly rounded; the thickness of the metal in the shaft is  $\frac{5}{8}$  inch; the flange at the bottom is 12 inches square and  $\frac{3}{4}$  inch thick; the average weight is 380 pounds. The shaft bears the following inscriptions, cast in raised letters: On the north face "CANADA", on the south face "UNITED STATES", on the east face "CONVENTION OF 1818", on the west face "TREATY OF 1908." The inscriptions read vertically from bottom to top. The number of the monument is outlined with drill holes on the face of the shaft. The monuments set on the "meridian line" were turned so that "UNITED STATES" appears on the east side and "CANADA" on the west side.

These monuments were filled with concrete and set in concrete bases with the top of the shaft 5 feet above the ground. They were used in 1908–13 to mark the line from Monument 303 eastward to the Northwesternmost Point of Lake of the Woods except where the cast-iron monuments of 1872–76 were reset as heretofore described.

Two monuments like those just described, except for the inscriptions, were used to reference the terminus of the meridian line, the point adopted by the treaty of 1925 in lieu of the Northwesternmost Point of Lake of the Woods. These monuments bear the words "REFERENCE MARK" cast in large raised letters on the side of the shaft facing the point referenced. The other three faces of the shaft are blank.

The general type of aluminum-bronze monument set in 1904–9 is shown in figure 2, page 116. These monuments are hollow shafts of aluminum-bronze, of a composition of about 10 percent aluminum and 90 percent copper, set in a concrete base. They were made of sectional design to facilitate transportation to their sites in the rugged mountain country by pack horses and by back-packing by men. Their design and dimensions are fully shown in the drawing.

The inscriptions on these monuments are of two different wordings. On those set west of the summit of the Rocky Mountains, consecutive numbers 2 to 272,<sup>1</sup> the inscriptions are cast in small raised letters in horizontal lines across the middle section of the shaft and are as follows: On the north face "CANADA", on the south face "UNITED STATES", on the east face "TREATY OF 1846, LINE ESTABLISHED 1857–1861, SURVEYED AND MARKED 1903–1907." The west face is blank except for the number of the monument, which is in raised figures on a plate that is attached to the top section of the shaft by means of a grooved slot designed for that purpose. On those set east of the summit of the Rocky Mountains, consecutive numbers 273 to 302, the inscriptions are cast in large raised letters, in vertical lines reading upward, on the top section of the shaft and are as follows: On the north



TYPICAL CAST-IRON MONUMENT USED ON THE PRAIRIE SECTIONS OF THE BOUNDARY; BENCH-MARK POST IN THE BASE

<sup>1</sup> No. 44-A is an aluminum-bronze monument of the standard type. No. 45 is a special conical bronze monument.



face "CANADA", on the south face "UNITED STATES", on the east face "TREATY OF 1908", on the west face "CONVENTION OF 1818." On the west face the number of the monument is outlined by drill holes.

The two types of monuments just described include the reference monuments and all of the consecutively numbered monuments from Monument 2 to Monument 925.

The general type of concrete monument for marking highway crossings is shown



EAST REFERENCE MONUMENT, AT THE NORTHWEST-  
ERNMOST POINT OF LAKE OF THE WOODS



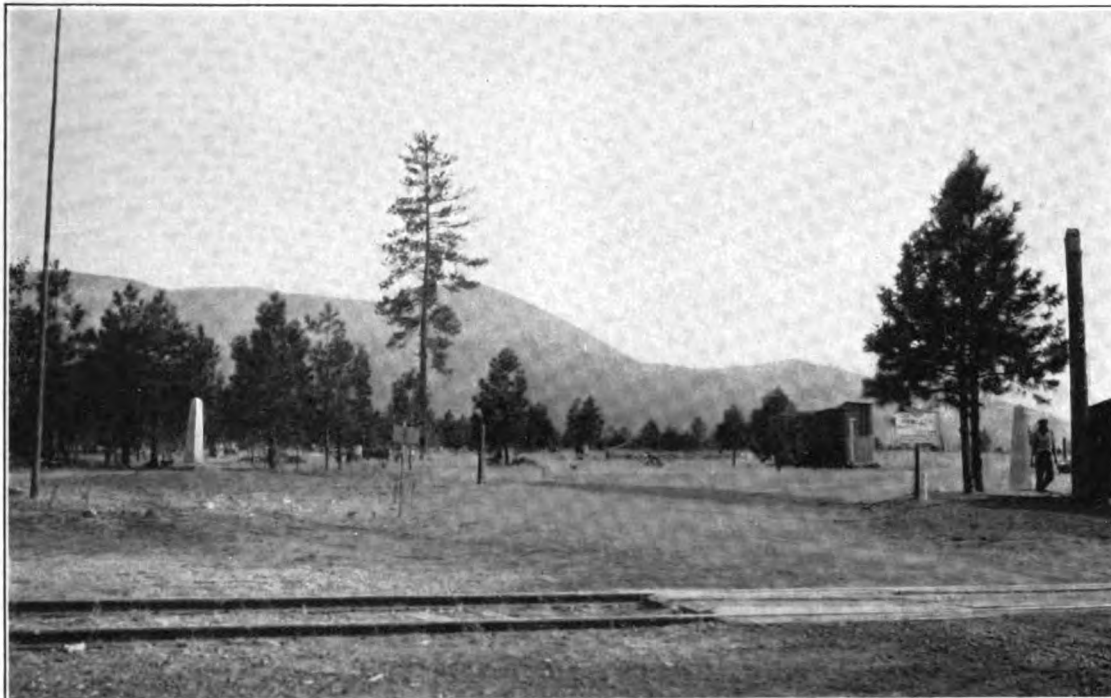
TYPICAL ALUMINUM-BRONZE SECTIONAL MONUMENT  
USED ON THE MOUNTAIN SECTIONS OF THE BOUND-  
ARY. COMMISSIONER OGILVIE AS A YOUNG SUR-  
VEYOR IN 1908

in figure 3, page 116. This design of monument, for marking the boundary crossings of important international highways during the course of maintenance work under the provisions of article IV of the treaty of 1925 on all parts of the boundary between the United States and Canada, was adopted by the Commissioners in 1928. Twenty-eight monuments of this type have been set in pairs, one on each side of the highway, at 14 road crossings on the 49th parallel boundary, numbered and located as follows:

Monuments 2-A and 2-B on the Ladner-Point Roberts highway; Monuments 3-A and 3-B on the Ladner-Boundary Bay highway; Monuments 5-A and 5-B, 5-C, and 5-D on the western crossings, and 5-E and 5-F on the eastern crossing of the Pacific Highway (Blaine-Vancouver); Monuments 116-A and 116-B at the crossing of the Wenatchee-Penticton highway; Monuments 165-A and 165-B at the crossing of the Kettle River Valley highway; Monuments 174-A and 174-B at the Northport-Rossland highway; Monuments 188-A and 188-B at the Spokane-Nelson highway; Monuments 216-A and 216-B on the Bonners Ferry-Cranbrook highway; Monuments 290-A and 290-B at the Browning-Cardston highway; Monuments 388-A and 388-B at the Havre-Medicine Hat highway; Monuments 711-A and 711-B at the Canal-to-Canada Highway; and Monuments 833-A and 833-B at the Minneapolis-Winnipeg highway.



MONUMENT 711-B, SHOWING TYPE OF MONUMENT USED IN PAIRS TO MARK THE BOUNDARY AT IMPORTANT HIGHWAY CROSSINGS



MONUMENTS 165-A AND 165-B SET ONE ON EACH SIDE OF THE HIGHWAY CROSSING THE BOUNDARY AT LAURIER, WASHINGTON

This type of monument is an ornamental concrete obelisk set in a plain concrete base. The surface of the obelisk or shaft is finished in light-colored granular quartz aggregate, washed free of cement so that the color and texture of the coarse granular aggregate shows clean. The shaft is 6 feet 6 inches in length and projects 5 to 5½ feet above the base. It is 14 inches square at the base and tapers to a cross-section of 8 inches square at the top, and is capped by a pyramid 4 inches in height. It is reinforced with four ½-inch steel rods extending throughout its length. The base of the monument is 3 feet 4 inches square. The top surface of the base slopes away



MONUMENT 0 (ZERO) AT HIGH-WATER MARK ON THE WEST SHORE OF POINT ROBERTS, GEORGIA STRAIT



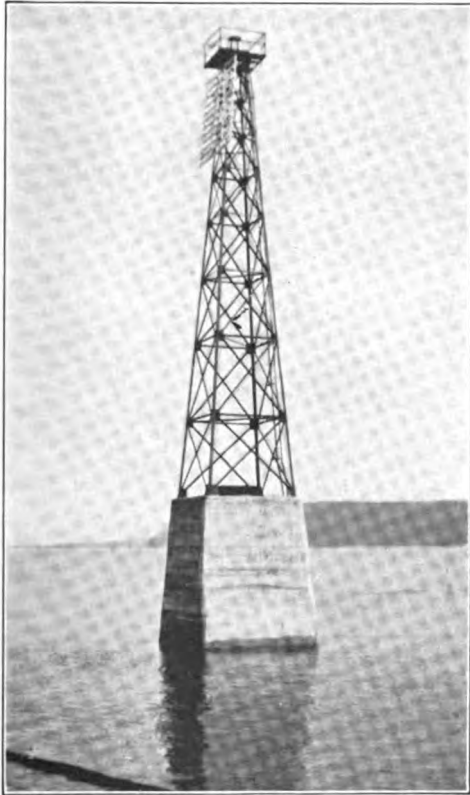
MONUMENT 1, THE GRANITE MONUMENT ERECTED ON POINT ROBERTS IN 1861

from the shaft uniformly on each side 4 inches to the foot. The base projects about 4 inches above the surrounding ground surface and extends down to a firm foundation not less than 3 feet 6 inches below the ground surface unless solid rock formation is encountered at a lesser depth. The base is constructed of 1:2:4 concrete which is poured in place at the time the monument is set.

The inscriptions on the shaft of the monument are cast in black aggregate flush with the surface. They read vertically upward and are as follows: On the side facing the highway "INTERNATIONAL BOUNDARY", on the side away from

the highway "TREATY OF 1925", on the north side "CANADA", on the south side "UNITED STATES." The number of the monument is engraved in the top surface of the base, with the exception of Monuments 388-A, 388-B, 833-A, and 833-B on which the number and the year of erection are cast in the shaft of the monument.

The special granite monument is shown in figure 4 on page 116. There is but one monument of this kind, Monument 1 on Point Roberts, on the eastern shore of Georgia Strait. It was erected in 1861 by the Commission of 1857-69 in the



OFFSHORE RANGE MARK ON THE WEST SIDE OF POINT ROBERTS



SHORE RANGE MARK, EAST SIDE OF BOUNDARY BAY, AND OBSERVING TOWER OVER MONUMENT 5

first survey of this section of the boundary. The monument is of cut granite. Its design and dimensions are shown in the drawing.

The inscriptions on the monument, cut in large letters in the granite, are as follows: on the north face—"CAPT. J. C. PREVOST. R. N., CAPT. C. H. RICHARDS. R. N., LT. COL. J. S. HAWKINS. R. E., H. B. Ms. COMMssrs"; on the east face—"LAT. 49° 0' 0'', LONG. 123° 3' 53'', ERECTED 1861"; on the south face—"ARCHIBALD CAMPBELL, U. S. COMMssr"; and on the west face—"TREATY OF WASHINGTON, June 15th 1846."

The special concrete monument with bronze post is shown in figure 5, page 116. There is but one monument of this kind, Monument 0 (zero) at the high-water mark on the west shore of Point Roberts. The monument is of reinforced monolithic concrete, constructed to withstand wave action and the battering of driftwood

brought in by the tide. It is in the form of a concrete pier 3 feet square and 7 feet 11 inches in height, set 4 feet 3 inches in the ground on hard glacial clay. In the center of the top of the pier is a 2-inch manganese-bronze post projecting 7 inches above the concrete. On the east face of this post is cast in raised letters the inscription "INT. BDRY.", on the north face "CANADA", on the south face "U. S.", and on the west face is inscribed "0" (zero), the designating number of the monument.

The towers used for range marks are shown in figures 6 and 7, page 117. These range marks are four in number. They are placed in pairs between Monuments 4 and 5—one pair on the west side of Boundary Bay near Monument 4 and one pair on the east side of Boundary Bay near Monument 5 to range the boundary across the 12 miles of navigable waters of Boundary Bay.



OFFSHORE RANGE MARK, EAST SIDE OF BOUNDARY BAY. PHOTOGRAPH BY J. S. MYERS, U. S. CUSTOMS SERVICE.



TYPE OF MONUMENT USED FOR MONUMENT 19-A

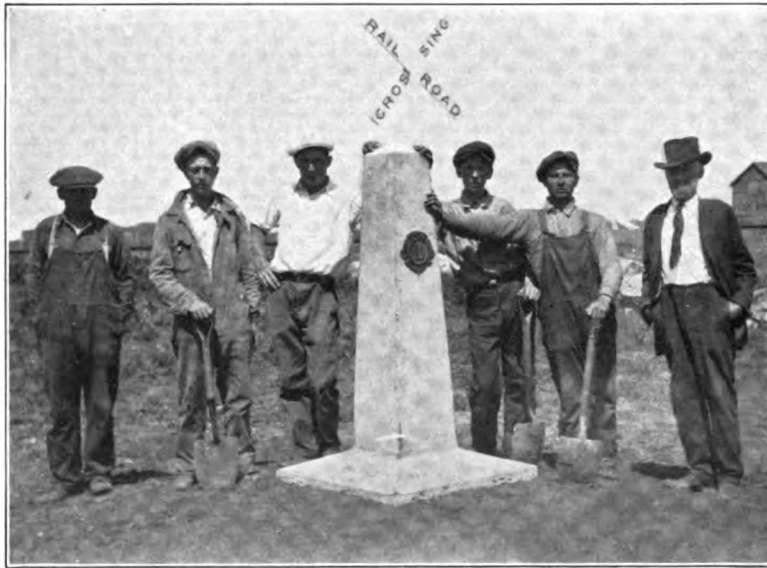
These two pairs of range marks differ from each other only in minor details of construction. Each pair is made up of a shore mark and an offshore mark. Each shore mark consists of a 60-foot steel tower set on a suitable concrete foundation, carrying on its top a lantern table and on its offshore side near the top a slatted day-mark 11 feet square. Each offshore mark consists of a 24½-foot steel tower, identical in construction with the upper section of the shore tower, set on a concrete pier approximately 25 feet above mean low-water level. A bronze tablet attached to the offshore face of the pier marks the exact intersection of the boundary line with the pier. Suitable lights will be maintained on the towers by night.

Similar range marks have been placed on the western shore of Point Roberts. They range the first course of the water boundary, 49th parallel to the Pacific Ocean.

The special concrete monument with bronze disk shown in figure 8, page 117, is designed for situations where a monument rising above the ground would be an obstruction to traffic. The monument is a concrete pier of such dimensions as to insure its permanence in its particular situation, set with its top surface flush with the ground, and bearing in the center of its top surface a 3-inch bronze disk engraved with a line to mark the boundary and, on the appropriate sides of the line, the words "UNITED STATES" and "CANADA." Two such monuments, Nos. 31-A and 31-B, mark the boundary crossing of the main street between the towns of Huntingdon, British Columbia, and Sumas, Washington.

The special concrete monument with inscription on base is shown in figure 9, page 117. There is but one of these monuments, Monument 19-A set in front of the Canadian customhouse at the port of Aldergrove about 12 miles east of Blaine, Washington.

The special conical bronze monument, Monument 45, is a hollow conical casting of aluminum-bronze about 30 inches in height, set in a concrete base. The number of the monument is inscribed in sunken letters on the west face of the concrete base. The monument is identical with some of those used on the 141st meridian boundary between Alaska



LIONS CLUBS MONUMENT, NO. 832-A, NEAR EMERSON, MANITOBA

and Canada.<sup>2</sup> The monument was set to mark a point previously selected for a monument and printed as such on the maps, but where no monument had been placed. At the time the discrepancy was noted no monument of the standard type was available. Another monument, of the standard aluminum-bronze type, set about  $\frac{1}{3}$  mile farther west, originally bearing the number 45, was renumbered 44-A in 1936.

The special concrete monument of the Lions Clubs (see photo above) is Monument 832-A, set on the west side of the highway between Pembina, North Dakota, and Emerson, Manitoba. The monument was erected in 1926 by the International Lions Clubs of Winnipeg, Manitoba, and Grand Forks, North Dakota. The Commissioners approved the design of the monument, located its exact site on the boundary, and superintended its erection. In 1929 the highway was moved about

<sup>2</sup> See Report, International Boundary Commission, 141st Meridian from the Arctic Ocean to Mount St. Elias, 1918, pages 187-190.



500 feet farther west and the Commissioners moved the monument to the west side of the new location of the highway. The monument is an obelisk of reinforced concrete made with white cement. It is 14 inches square at the base, 8 inches square at the top, and 5 feet high, and is set in a concrete base 3 feet 4 inches square. On the east side of the monument, facing the highway, is a bronze plaque which bears the insignia of the International Lions Clubs. The other three faces of the monument bear no markings.

While the several types of monuments have been designed for permanency and the monuments have been set with due regard to the effect of the soil and the climatic conditions on their stability, numbers of them have been damaged or displaced, some by falling timber and forest fires, others, set in marshy ground, by being heaved out

of position by the action of frost, and still others by acts of vandalism. Those known to be damaged have been restored to their original condition. Future repair work will be necessary from time to time.

### THE BOUNDARY VISTA

To supplement the boundary monuments, the line has been marked through all tree- and brush-grown areas by a cleared vista 10 feet on each side of the line. The importance of this adjunct to the monuments in the demarcation of the boundary has been recognized in practice by present and former Boundary Commissions for this and other sections of the boundary between the United States and Canada. It is the best means by which the boundary can be made easily recognizable through heavily timbered areas. The total length of boundary vista on this section of the line is 488 miles.

Brush and second-growth timber grow rapidly, and it is necessary from time to time to reopen the vista in order to preserve its value. On the west coast from Monument 1 to Monument 43, where the new growth is the most rapid, it has been necessary to reclear the vista several times since it was first cleared. The reclearing



THE BOUNDARY VISTA, LOOKING EAST TOWARD MONUMENT 249, EAST OF GATEWAY, MONTANA

was done in 1922, in 1928, and again in 1933 and 1934. Through the Turtle Mountains and the Pembina Mountains on the North Dakota-Manitoba boundary, the vista was recleared in 1932. On the Minnesota-Manitoba boundary from the Red River to the Northwesternmost Point of Lake of the Woods the vista was recleared in 1928. On the Rocky Mountain and the Cascade Mountain sections of the line about 200 miles of vista was recut in 1933 to 1936. Vista recutting must frequently be done as a part of maintenance under the provisions of the treaty of 1925.

### TOPOGRAPHY

As there were no "accurate modern charts" of the territory traversed by this section of the boundary as required first by agreement between the two Governments, and later by articles VI and VII of the treaty of 1908, the Commissioners agreed to



TOPOGRAPHIC RODMAN WORKING ON HORSE.  
BACK ON THE PRAIRIE



TOPOGRAPHIC MAPPING WITH THE PLANE TABLE IN THE  
CASCADE MOUNTAINS

map an area adjacent to the boundary line on a scale and with a contour interval which would clearly show the topographic features of the country.

From Georgia Strait to the eastern base of the Rocky Mountains in longitude  $113^{\circ}30'$  the terrain is for the most part rugged and heavily timbered. Along this section the mapping extended for a width of not less than 2 miles on each side of the boundary, with a contour interval of 100 feet.

From the eastern base of the Rocky Mountains across the Great Plains to the crossing of the Roseau River in longitude  $96^{\circ}30'$ , the width of the country mapped was reduced to not less than 1 mile on each side of the boundary, with a contour interval of 20 feet.

From the crossing of the Roseau River across the swamp areas to the west shore of Lake of the Woods, the width remained the same but the contour interval



was reduced to 10 feet. Buffalo Bay of Lake of the Woods, the "meridian line", and Northwest Angle Inlet were similarly mapped.

Horizontal control for the maps was furnished by triangulation and traverse (p. 114) and vertical control by lines of levels, stadia traverse along the boundary, and vertical angles (see below).

The methods used by the United States surveyors differed somewhat from those used by the Canadians, but where areas overlapped for short distances the results were surprisingly similar. The United States parties used the plane table exclusively with a field scale of 1:45,000, while under Canadian technique the topography of mountainous regions was developed by phototopography supplemented by traverses of about the same character as that used by the United States parties. On the sections of low relief the Canadian parties used a specially devised instrument for combined level lines and stadia traverse. This was accompanied by notebook sketches and hand-level readings. Notes and sketches were plotted and adjusted on field sheets kept in camp, thus affording opportunity for correcting errors and for filling in any overlooked areas.

### VERTICAL CONTROL

The vertical control for the topographic maps includes elevations of bench marks that had previously been established by other agencies on or near the boundary, lines of levels run from previously established bench marks to convenient points on the boundary, and, where the character of the country made it practicable, lines of levels along the boundary from monument to monument.

At the time the surveys for the boundary maps were made and the boundary levels run, most of the bench marks available for initial elevations were in unadjusted circuits with elevations subject to corrections, to be later determined, to reduce them to true mean-sea-level datum. Since that time, the United States Coast and Geodetic Survey and the Geodetic Survey of Canada have each run many miles of first-order levels paralleling, and in places crossing, the boundary, often connected at common bench marks. Each of these organizations has completed the adjustment of its first-order net of levels, and elevations of bench marks of each organization are now known on slightly differing mean-sea-level datums. The bench marks of the boundary survey and the bench marks upon which they were based have been tied to these first-order bench marks in many places, making it possible to adjust the elevations used in the boundary mapping to mean-sea-level datum as determined by the Geodetic Survey of Canada.

The elevations published in this report (appendix IV, p. 218) have been adjusted, except for an instance or two noted, to agree with the elevations of the Geodetic Survey of Canada as published in 1929 and 1930.<sup>3</sup>

The elevations on the boundary maps were determined, as has been noted, and the maps were printed several years before data for the final adjustment of the elevations were available. Therefore, the elevations shown on the maps differ slightly from those published in appendix IV of this report.

<sup>3</sup> Precise Levelling in Manitoba (Publication No. 21), Precise Levelling in Saskatchewan (Publication No. 22), Precise Levelling in Alberta (Publication No. 23), and Precise Levelling in British Columbia (Publication No. 24), Geodetic Survey of Canada, 1929 and 1930.

For the vertical control of the maps of the section of boundary from Georgia Strait to the eastern base of the Rocky Mountains, a system of level lines in combination with vertical angles and stadia surveys was used, described as follows:

On Point Roberts, where no bench marks were available, sea level from local observations was used as the datum for the mapping. No bench marks were established in this locality.

Across the coastal plain from Boundary Bay to the base of the Cascade Mountains, bench marks of the United States Geological Survey, established in 1905 along and near the boundary from Blaine, Washington, to Sumas, Washington, were used for the control of stadia surveys of the topography. Since the mapping was done, the United States Coast and Geodetic Survey and the Geodetic Survey of Canada have both run first-order level lines to Blaine, connecting with each other and with the United States Geological Survey bench marks. The Geodetic Survey of Canada has established first-order bench marks on the boundary at Sumas-Huntingdon.

At the boundary crossing of the Pasayten River a bench mark was established by running a checked line of levels from a United States Geological Survey bench mark at Barron,<sup>4</sup> Washington, through Windy Pass and down the Pasayten River to the boundary. From Sumas, Washington, through the high mountain region to the crossing of the Pasayten River, elevations were determined by vertical angles and stadia traverse based on the elevations of the bench marks at Sumas and at the Pasayten River.

From the Pasayten River eastward, elevations were likewise determined by vertical angles and stadia traverse to the Similkameen River, where connections were again made with United States Geological Survey bench marks.

From the Similkameen River eastward to the eastern crossing of the Kettle River at Laurier, Washington, sufficient vertical control was provided by United States Geological Survey bench marks which since have been tied to first-order level lines of the United States Coast and Geodetic Survey and of the Geodetic Survey of Canada.

From the eastern crossing of Kettle River at Laurier to the Columbia River crossing, elevations were obtained by vertical angles and stadia surveys based on bench marks at both places.

The bench mark at the boundary crossing of the Columbia River was established by a double-run line of levels, 43 miles in length, from a United States Geological Survey bench mark at Meyers Falls, Washington. This line has since been tied to the first-order lines of both the United States and of Canada.

From the boundary crossing of the Columbia River eastward to the western crossing of the Kootenai River at Porthill, Idaho, elevations depend entirely on vertical angles and stadia surveys. However, since the boundary maps were made, a highway from Spokane, Washington, to Nelson, British Columbia, crossing the boundary about 2½ miles east of Clark Fork (Pend-d'Oreille), has been built and a bench mark established at the boundary crossing by the United States Geological Survey. The Geodetic Survey of Canada has checked the elevation of this bench mark.

<sup>4</sup> Barron a mining camp near Slate Creek, no longer exists.

At the west crossing of the Kootenai River at Porthill, Idaho, a bench mark was established by running a double line of levels from a Great Northern Railway elevation at Bonners Ferry, Idaho, through Porthill to a Canadian Pacific Railway elevation at Creston, British Columbia. Since the boundary maps were made, the Geodetic Survey of Canada has tied to the Porthill bench mark from the north with a first-order level line, and the United States Coast and Geodetic Survey has tied to it with a first-order level line from the south.

From the west crossing of the Kootenai at Porthill to the east crossing of the Kootenai at Gateway, Montana, the elevations on the boundary maps depend on vertical angles and stadia surveys.

At Gateway, bench marks were established by a double-run line of levels from Rexford, Montana, based on a Great Northern Railway elevation. This line has since been rerun by the United States Coast and Geodetic Survey as a part of their first-order levels.

From the east crossing of the Kootenai at Gateway to the North Fork of the Flathead River, the elevations on the boundary maps depend on vertical angles and stadia surveys.

Bench marks were established on the Flathead River by a double-run line of levels from a United States Geological Survey bench mark near Apgar, in the vicinity of Belton, Montana, on the Great Northern Railway datum. This line has since been reduced to first-order datum by a connection with first-order levels of the United States Coast and Geodetic Survey at Belton.

Across the summit of the Rocky Mountains to the valley of the St. Mary River at their eastern base, vertical angles and stadia surveys were the means of determining elevations for the topographic mapping.

In the St. Mary River valley near the boundary, the United States Geological Survey and the United States Reclamation Service had established a number of bench marks from lines of levels run in circuits from the Great Northern Railway in the vicinity of Fort Browning and Cutbank, Montana. These circuits have recently been reduced to first-order datum through connections with the first-order levels of the United States Coast and Geodetic Survey at Fort Browning and at Cutbank.

This combination of levels, stadia surveys, and vertical angles sufficed for mapping, on a 100-foot contour interval, the rugged country from Georgia Strait to the eastern base of the Rocky Mountains. At this point the abrupt change in the character of the country demanded that a much smaller contour interval be used eastward to accurately portray the topography. This required much more accurate vertical control and necessitated the running of almost continuous lines of levels along the boundary.

From the United States Geological Survey bench marks in the valley of the St. Mary River, a single line of wye levels was run continuously along the boundary eastward for 62 miles to a connection with United States Geological Survey and United States Reclamation Service bench marks near the crossing of the Great Northern Railway at Coutts-Sweetgrass. Permanent bench marks were established all along the boundary, either in the bases of or near the boundary monuments. This

line has now been adjusted to close on a Geodetic Survey of Canada first-order bench mark at Coutts.

From Coutts, Alberta, eastward for 207 miles to Monument 478, about 4 miles west of Frenchman Creek, wye levels were run along the boundary and the elevation of each monument determined, but no permanent bench marks were set.

Later, the United States Geological Survey established about 25 bench marks along this section of the boundary and many of these were used to check the boundary levels. The descriptions and elevations of these United States Geological Survey bench marks are included in appendix IV.

The elevation of Monument 486 was determined by a line of levels about 36 miles in length run from a United States Geological Survey bench mark designated "Rock Creek triangulation station", about 12 miles north of Hinsdale, Montana. The elevation of the bench mark in Monument 486 has since been determined by first-order levels by both the United States Coast and Geodetic Survey and the Geodetic Survey of Canada.

From Monument 486 westward to Monument 478 a double line of levels was run and a permanent bench mark established at each monument.

The elevation of Monument 538 was determined by running a line of levels approximately 40 miles in length from a United States Geological Survey bench mark near Custer's ranch, about 20 miles south of Scobey, Montana. The line was continued westward along the boundary and closed on Monument 486. A permanent bench mark was established at each boundary monument.

The elevation of Monument 615 was determined by a line of levels approximately 52 miles in length run from a United States Geological Survey bench mark at Ray, North Dakota. Levels were then run westward along the boundary from Monument 615 to a closure on the bench mark at Monument 538. A permanent bench mark was established at each monument. The elevation of the bench mark at Ray has since been determined by first-order levels of the United States Coast and Geodetic Survey.

From Monument 615 eastward, a line of levels was run to Monument 630 at Portal, North Dakota, a distance of 22 miles. A permanent bench mark was established at each monument. Since the time the boundary levels were run, the elevation of the bench mark in Monument 630 has been redetermined by first-order levels of both the United States Coast and Geodetic Survey and the Geodetic Survey of Canada, and this first-order elevation has been used in adjusting the boundary levels to the westward as far as Monument 486, where the elevation was determined by first-order levels in like manner.

From Monument 630 to Monument 693, the elevation of each monument was determined by a line of levels along the boundary, but no permanent bench marks were established.

From Monument 693 to Monument 721, across the Turtle Mountains, the boundary maps were made in 1910 and 1911. On account of the rough character of the terrain, the level lines run in connection with the mapping were not run along the boundary itself but along roads paralleling the boundary and at some distance

from it; and no permanent bench marks were established. In 1911 the Geodetic Survey of Canada established a first-order bench mark in the base of Monument 693, and in 1917 established a bench mark of the same order in the base of Monument 721. In 1918 the Boundary Commission, in connection with checking some triangulation, ran a line of levels along the boundary between the two monuments and determined the elevation of a point on the base of each intervening monument.

From Monument 721 to Monument 832, levels were run continuously along the boundary and the elevation of the ground at each monument was determined. No permanent bench marks were established. Since the time these levels were run, the Geodetic Survey of Canada has established several first-order bench marks on or near this section of the boundary.

From Monument 833 at Red River to Monument 911 at Lake of the Woods, a distance of approximately 90 miles, a continuous line of levels was run along the boundary and a permanent bench mark was established in the base of each monument. This section of the boundary crosses a comparatively flat terrain including many miles of the Great Roseau Swamp where accurate leveling is extremely difficult. The leveling instrument used on this work was a specially designed Bausch and Lomb dumpy level equipped with a micrometer screw under one end of the telescope to keep the level bubble centered, and with a mirror by which the observer watches the level bubble while reading the rod. The levels were run in short circuits, and made to close within a limit of 0.05 foot multiplied by the square root of the length of the circuit in miles. The boundary levels within this section were run in 1912. They were started from the Geodetic Survey of Canada first-order bench mark 3-C in the foundation wall of the post office at Emerson, Manitoba, and were closed on a United States Geological Survey bench mark in Warroad, Minnesota, about 7 miles south of the boundary. The following year, 1913, the Geodetic Survey of Canada ran a first-order level line from Emerson, Manitoba, along the Canadian Northern (now Canadian National) Railway through Warroad to Rainy River, Ontario, and established bench marks along the line. They determined the elevation of Monument 909 and of the United States Geological Survey bench mark in Warroad. The boundary levels have been adjusted to agree with the adjusted values of the elevations of these first-order bench marks.

In 1929 and 1930 the Topographical Survey of Canada, in the course of special topographic work, redetermined the elevations of Monuments 853 to 903, inclusive, through a system of levels based on the Geodetic Survey of Canada first-order bench marks between Emerson and Sprague. With the exception of certain instances where the monuments have been disturbed either by settling or by heaving, due to the action of frost in the swampy districts, these redetermined elevations are in good agreement with those originally determined by the boundary levels. For the reason that a number of the monuments had been disturbed since the boundary levels were run, the elevations determined by the Topographical Survey of Canada for Monuments 853 to 903 have been adopted and published in the list of "Elevations along the 49th Parallel Boundary", appendix IV, page 240.

The vertical control for the meridian line, Monument 913 to Monument 925, was included in the vertical control for the entire boundary survey of Lake of the

Woods. For this survey, staff gages were established at Warroad, Minnesota, Oak Island, Oak Point (near the mouth of Rainy River), and in Northwest Angle Inlet. The elevation of the zero of the gage at Warroad was determined in May 1912 by connecting it by means of a double line of levels with the United States Army Engineers' bench mark at Warroad, the elevation of which had been determined by the United States Geological Survey. Readings of the elevation of the water surface were made on this gage three times each day from June 1 to October 31, 1912, and from April 28 to October 31, 1913. A similar series of readings was made on the Oak Island gage from June 8 to October 31, 1912, and from May 4 to October 27, 1913, and on other gages for shorter periods. From these readings an accurate determination of the Oak Island, Oak Point, and Northwest Angle Inlet gages was made by comparison with the readings of the Warroad gage. The elevations along the meridian line were determined from the Northwest Angle Inlet gage. These elevations have now been converted to the datum of the Geodetic Survey of Canada first-order levels through their determination of the elevation of the United States Army Engineers' bench mark at Warroad.

### FIELD TRANSPORTATION

At the time the resurvey of this section of the boundary was begun, in 1901, the era of good roads was still in the future; the automobile and the motor truck had scarcely passed the experimental stage. Along much of the boundary there were no roads whatever; and where roads existed they were unsurfaced and rough at their best and all but impassable at their worst. The transportation of men, supplies,



TEAMS AND WAGONS WERE USED FOR TRANSPORTATION ON THE PRAIRIE

and material for the boundary survey work was a slow and arduous task which had to be carried on with the primitive equipment of pioneer days of horse-drawn wagon, the pack train, and at times by back-packing by the men themselves.

The 400 miles of boundary west of the summit of the Rocky Mountains was at that time directly accessible by railways or wagon roads at the following places only: On the west coast from Blaine, Washington, to the west base of the Cascade Mountains; from the Similkameen River to the east crossing of the Kettle River; the Columbia River Valley; the valley of the Kootenai at Porthill, Idaho; the valley of the Kootenai at Gateway, Montana; and the valley of the North Fork of the Flathead River. Between these places transportation was furnished by pack train over trails opened up or built by the survey parties. In many instances material for the monuments marking the boundary, including sand, cement, and water had to be delivered on the backs of men.

During the 5 years from 1903 to 1908 approximately 400 miles of pack trails were opened up and maintained and at the peak of the work more than 100 head of pack horses were in use.

In the years since 1908, the extension of railroads and modern highways, on both sides of the boundary, and the development of United States Forest Service roads and trails have made the boundary west of the summit of the Rocky Mountains more easily accessible, but there are still long stretches where trails have to be opened and pack trains have to be used for maintenance work.

East of the summit of the Rocky Mountains the country was adequately served by railroads both north and south of the boundary and by a number of lines crossing it. The general open prairie character of the country made transport from railroad points to and along the boundary much easier than to the westward.

### THE OFFICIAL MAPS

Article VII of the treaty of 1908 with regard to the boundary from the Gulf of Georgia (Georgia Strait) to the summit of the Rocky Mountains stipulates that "the entire course of said boundary, showing the location of the boundary monuments and marks established along the course of the boundary, shall be marked upon quadruplicate sets of accurate modern charts prepared or adopted for that purpose, and the said Commissioners, or their successors, are hereby authorized and required to so mark the line and designate the monuments on such charts, two duplicate originals of which shall be filed with each Government \* \* \*."

Similarly, with regard to the boundary from the summit of the Rocky Mountains to the Northwesternmost Point of Lake of the Woods, article VI of the treaty provides that "the said Commissioners shall mark upon quadruplicate sets of accurate modern charts prepared or adopted by them for that purpose the entire course of said boundary and the location of the boundary monuments and marks established along the course of said boundary, and two duplicate originals thereof shall be filed with each Government \* \* \*."

The charts upon which the Commissioners have marked the boundary line from Georgia Strait to the Northwesternmost Point of Lake of the Woods, in accordance

with these provisions of the treaty of 1908, are topographic maps prepared from surveys made by the field force of the Commission. The word "map" when used herein is synonymous with the word "chart" of the treaties. They consist of a series of 59 sheets, arranged and numbered as shown on an accompanying index map, together with a profile sheet. They were engraved on copper plates and printed from lithographic stones as were other similar boundary maps. The engraved plates will be preserved by the two Governments as permanent records of the work. The four official sets of maps, two for each Government, which bear the Commissioners' signatures, are transmitted in atlas form with this report.

The size of each map is 11 by 24½ inches inside the border. The conventional signs used to represent the topographic features are those used by the United States Geological Survey (which engraved sheets 1 to 19, inclusive), and are the same as those adopted by the United States Federal Board of Surveys and Maps. The boundary line, monuments, culture, and lettering appear in black; relief (contour lines and elevations) in brown; drainage, in blue; and timber, in green. The maps are constructed on polyconic projections on a scale of 1: 62,500, each covering 30 minutes of longitude. At the top of each map are the title, the number of the sheet, copies of the seals of the two countries, and the names of the Commissioners under whom the surveys were made. In the lower right corner is the Commissioners' certificate, which reads as follows:

Sheet 1, typical of sheets 1 to 19:

We certify that this chart is one of the quadruplicate set of fifty-nine (59) charts adopted by us under Articles VI and VII of the Treaty between Great Britain and the United States, signed at Washington April 11, 1908, and that we have marked thereon the Boundary Line as re-established by us in accordance with the provisions of the said Articles.

(Signed) O. H. TITTMANN  
*United States Commissioner*

(Signed) W. F. KING  
*His Britannic Majesty's Commissioner*

Sheet 20, typical of sheets 20 to 58:

We certify that this chart is one of the quadruplicate set of fifty-nine (59) charts adopted under Articles VI and VII of the Treaty between Great Britain and the United States, signed at Washington April 11, 1908, and that we have marked thereon the Boundary Line as re-established by the Commissioners designated above, in accordance with the provisions of the said Articles.

Signed, November 17, 1921

(Signed) E. LESTER JONES  
*United States Commissioner*

(Signed) J. J. McARTHUR  
*His Britannic Majesty's Commissioner*

Sheet 59:

We certify that this chart is one of the quadruplicate set of fifty-nine (59) charts adopted under Articles VI and VII of the Treaty between Great Britain and the United States, signed at Washington April 11, 1908, and that we have marked hereon the Boundary Line as re-established by the Commissioners designated above, in accordance with the provisions of Article VI of the Treaty of 1908 and of Article I of the Treaty between the United States and His Britannic Majesty, in respect of the Dominion of Canada, signed at Washington, February 24, 1925.

Signed December 7, 1927

(Signed) E. LESTER JONES  
*United States Commissioner*

(Signed) J. D. CRAIG  
*His Britannic Majesty's Commissioner*



It will be noted that the last chart or map was signed on December 7, 1927. The terms of the treaty of 1908 in respect to monumenting and mapping had then been fully carried out. Subsequent to this date several additional monuments and marks have been placed on the boundary under authority of the treaty of 1925. These additional monuments and marks have all been reported on and shown on charts in the annual joint reports of the Commissioners to their Governments as required by the treaty of 1925. Under the circumstances the Commissioners deemed it to be inexpedient and unnecessary to bring the revision of the maps, regarding monuments, roads, and buildings, up to the date of certification of this report, but have included in the report the descriptions of the monuments and marks as valuable information supplemental to the requirements of the treaty of 1908.

A limited edition of copies of the official maps has been printed for each Government for distribution to governmental agencies, to libraries, and to others interested in the location of the boundary line. These copies are identical reproductions of the maps of the official sets and differ from them only in the following respects: They are printed on chart paper instead of the heavy bond paper on which the official sets are printed; they bear the date of publication, which the official sets do not; the Commissioners' signatures are in facsimile; and they are designated as copies. On sheets 1 to 19 the Commissioners' certificate differs slightly from that on the official sets; it reads: "We certify that this chart is a copy of sheet No. — of the quadruplicate set of fifty-nine (59) charts adopted by us under Articles VI and VII of the Treaty between Great Britain and the United States, signed at Washington April 11, 1908, on which we marked the Boundary Line as re-established by us in accordance with the provisions of the said Articles." On sheets 20 to 59 the certificate of the Commissioners is the same as on the official sets, but the word "COPY" has been printed above the title. The date of signature on these copies occurs only on sheets 42 to 59.

In the United States, copies of the report and maps are on file in the Library of Congress and in other libraries designated by the Government as depository libraries—that is, those which receive all United States Government publications. In Canada they are on file in the Dominion Archives, in the libraries of the Dominion Parliament and of the provincial legislative assemblies, and in university and reference libraries throughout the country.

ESTABLISHMENT OF THE POINT ADOPTED IN LIEU OF THE ORIGINAL NORTHWESTERNMOST POINT OF LAKE OF THE WOODS IN ACCORDANCE WITH THE PROVISIONS OF THE TREATY OF 1925

In 1824 David Thompson, surveyor and astronomer for the British Government, received instructions from the Commissioners under article VII of the Treaty of Ghent to determine the "most northwestern point" of Lake of the Woods originally named in the treaty of peace, 1783, as the point to which the International Boundary was to run westward through the waterways from Lake Superior. Accordingly, in the course of his surveys of the western and northern portions of Lake of the Woods in 1824, Thompson selected, monumented, and determined the astronomical positions of three points which, in his opinion, came nearest to meeting the requirements of the treaty—a point in Northwest Angle Inlet; a second point in Monument Bay, east and a little north of Northwest Angle Inlet; and a third in Portage Bay still farther north. Another point which was later to be given consideration as the probable site of the Northwesternmost Point was at Rat Portage (Kenora), where an extensive series of astronomical observations had been made by Thompson during the previous year.

As a result of Thompson's work it was apparently realized that it would be necessary, in finally selecting the "most northwestern point", to choose between Rat Portage and the locality of the first point marked by Thompson in 1824, near the head of Northwest Angle Inlet. Accordingly, in the following year, 1825, Dr. J. L. Tiarks, astronomer for the British Government, inspected these two localities and decided that a point nearly a mile north of Thompson's monument in Northwest Angle Inlet was the true "most northwestern point" of Lake of the Woods. Tiarks' astronomic determination of the position of this point placed it in latitude  $49^{\circ}23'55''$ , longitude  $95^{\circ}14'38''$ .<sup>1</sup>

Accordingly, in 1842 this point was accepted by the two Governments, and until the treaty of 1925 it figured in boundary history as the western terminus of the section of the line from Lake Superior to Lake of the Woods and the initial point of the section of the line running south therefrom to the 49th parallel and thence westward to the Rocky Mountains.

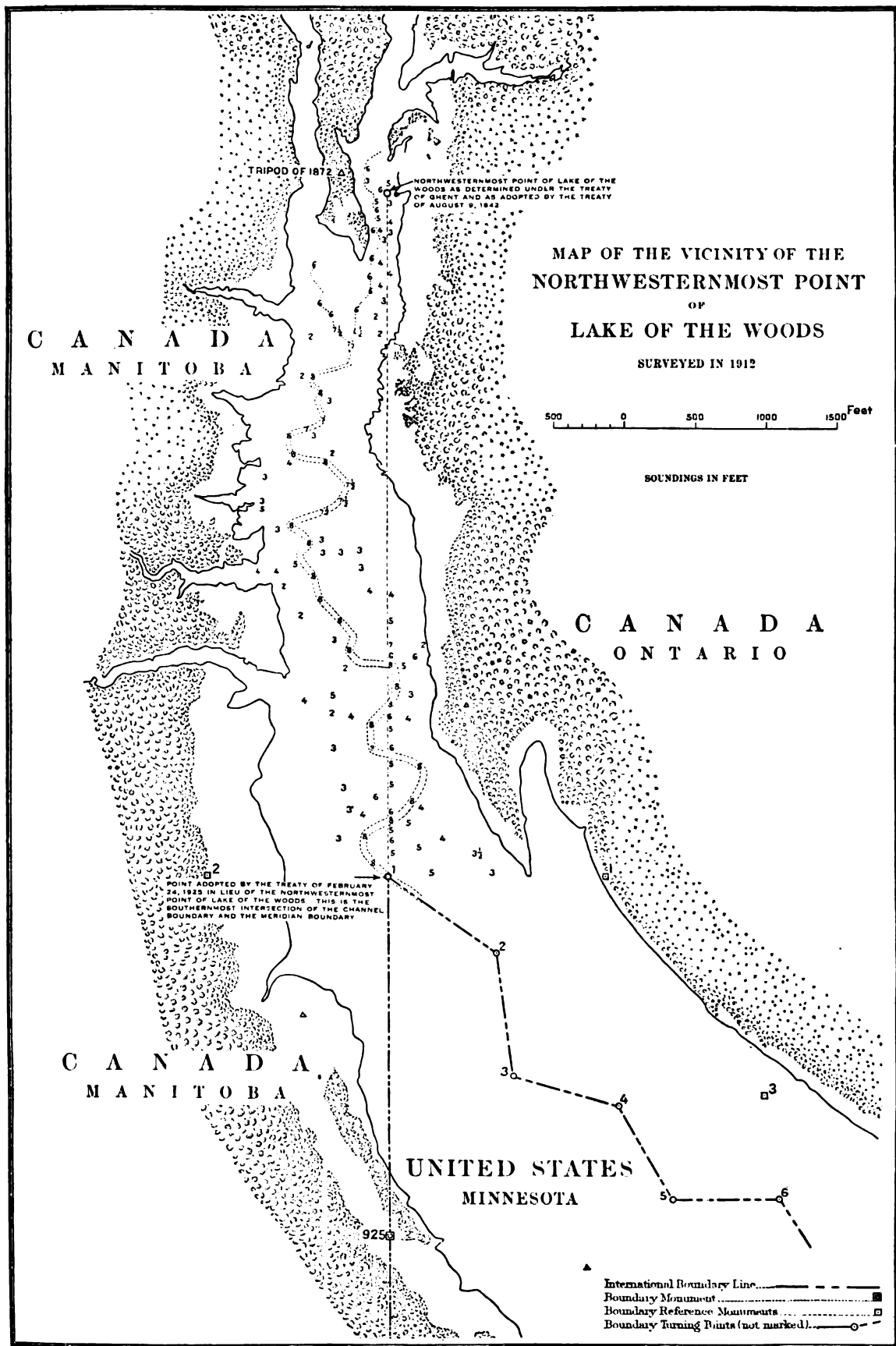
It was indicated, however, on a map made by the Boundary Commission of 1872–1876,<sup>2</sup> and the fact was definitely established by the surveys made in 1912<sup>3</sup>

<sup>1</sup> Art. II, treaty of 1842, p. 189 of appendix II. Also Journal of the Commissioners under the Treaty of Ghent, U. S. House of Representatives Document No. 451, 25th Cong., 2d sess., p. 48.

On the North American datum of 1927 the coordinates of the Northwesternmost Point are latitude  $49^{\circ}23'51''.35$ , longitude  $95^{\circ}09'11''.36$ .

<sup>2</sup> See map published in Report upon the Survey of the Boundary between the Territory of the United States and the Possessions of Great Britain from the Lake of the Woods to the Summit of the Rocky Mountains, by Archibald Campbell, United States Commissioner, p. 83.

<sup>3</sup> See map, p. 138.



under the treaty of 1908 that the straight course of boundary running due south from the Northwesternmost Point was intersected at five points by the winding course of boundary which follows the deep-water channel of Northwest Angle Inlet, thereby leaving two small areas of United States waters entirely surrounded by Canadian waters, a territorial delimitation neither intended nor desired by either Government.<sup>4</sup>

The Commissioners acting under the treaty of 1908 therefore agreed that the southernmost point of intersection of these lines, as determined in 1912, should be permanently fixed and monumented and were prepared to recommend to the two Governments, as they later did, that this point be adopted in lieu of the original Northwesternmost Point specified in articles V and VI of the treaty of 1908, so as to eliminate from the general line of demarcation between the two countries the intersecting portions of the boundary north of this point.<sup>5</sup>

The Commissioners' recommendations that this point be adopted in lieu of the Northwesternmost Point were acceptable to the two Governments, and in 1925 the point was formally adopted by article I of the treaty of that year, which in part reads as follows:

The Contracting Parties, in order to provide for a more practical definition of the boundary between the United States and the Dominion of Canada in Lake of the Woods, hereby agree that this most southerly point of intersection, being in latitude 49°23'04".49 north, and longitude 95°09'11".61 west, shall be the terminus of the boundary line heretofore referred to as the international boundary line between the United States and the Dominion of Canada from the mouth of Pigeon River, at the western shore of Lake Superior, to the northwesternmost point of Lake of the Woods and the initial point of the boundary line heretofore referred to as the international boundary between the United States and the Dominion of Canada from the northwesternmost point of Lake of the Woods to the summit of the Rocky Mountains, in lieu of the said northwesternmost point.

Article I of the treaty of 1925 further provides that "The aforesaid most southerly point shall be located and monumented by the Commissioners appointed under the said Treaty of April 11, 1908, and shall be marked by them on the chart or charts prepared in accordance with the provisions of Articles V and VI of the said Treaty, and a detailed account of the work done by the Commissioners in locating said point, together with a description of the character and location of the several monuments erected, shall be included in the report or reports prepared pursuant to the said Articles."

<sup>4</sup> In 1902 the question of jurisdiction was raised by the General Land Office of the United States with respect to the areas enclosed between the meridian boundary and the channel boundary, and an opinion regarding this question was requested of the Department of State. The solicitor of that department, in a letter from the Secretary of State to the Secretary of the Interior dated June 25, 1904, advised against disposing of any lands in these areas and made the following reference to the boundary line in this vicinity:

"It has been suggested that since it was the intentment of the treaty [of 1842] to settle finally the continuous boundary line between the two countries, all that portion of the line described in the treaty which lies north of the first intersection of the meandering and the meridional lines should be rejected. This would leave a single continuous boundary line running along the line described from Rainy Lake to its first point of intersection with the meridian line, thence south along the meridian line to the 49th parallel, thence west to the Rocky Mountains."

<sup>5</sup> This peculiar situation was given some consideration by the Commissioners of the survey of the boundary from Lake of the Woods to the Rocky Mountains, made in 1872 to 1876, as is shown by the report of the British Commissioner on file in the archives of the Canadian Government at Ottawa, but no formal action was taken.

In setting forth herein, as prescribed by the foregoing paragraph of the treaty, the detailed account of the work done by the Commissioners in locating said point, etc., it should be stated at the onset that practically all of the work of determining, locating, and monumenting the point specified by the treaty in lieu of the Northwesternmost Point was actually done several years prior to the adoption of the point by the two Governments in 1925.

Late in the fall of 1912 a United States party under Mr. E. C. Barnard, surveyor in charge, made a detailed geodetic, topographic, and hydrographic survey of the northern part of Northwest Angle Inlet for the purpose of determining the position of the Northwesternmost Point and the course of the channel boundary southward therefrom. Although the surveyors of the Boundary Commission of 1872-1876 had redetermined the position of the Northwesternmost Point<sup>6</sup> and had monumented the meridian line southward therefrom with durable cast-iron monuments, they had not monumented the point itself. It was necessary, therefore, in connection with the survey of 1912, that the point again be redetermined, and as the party could find no trace of the reference monument erected by David Thompson in 1824, the work of recovering the Northwesternmost Point had to be done entirely from the records of the survey of 1872, that is, by projecting the meridian line northward from Monument 925 and laying off thereon the recorded distance from Monument 925 to the Northwesternmost Point.

Accordingly, an 833-meter base line was measured with invar tape along the western shore of the inlet in the vicinity of the meridian line, and from this base a small scheme of triangulation was expanded up the inlet to include the site of the Northwesternmost Point and also southward to a junction with the general scheme of triangulation of Lake of the Woods which had been begun in Northwest Angle Inlet earlier that year by a Canadian party. Monument 925 of the meridian boundary was included in the triangulation, and the azimuth of that line was checked by an astronomic azimuth which was observed at station "New Rice." The meridian line was then projected north from Monument 925, and on this projected line a signal was erected near the probable site of the Northwesternmost Point and tied to the scheme of triangulation. The position and distance of this point relative to Monument 925 were then computed, and the precise location of the Northwesternmost Point was determined therefrom by laying off from this arbitrarily chosen point such distance on the meridian line as would make the distance from Monument 925 to the Northwesternmost Point precisely 7,307 feet, which was the distance determined originally by the surveyors of the Boundary Commission of 1872-1876.<sup>7</sup>

<sup>6</sup> The surveyors of 1872 recovered the position of the Northwesternmost Point from the reference monument erected by David Thompson in 1824. This monument is described by Thompson as consisting of "a square monument of logs of 12 feet high by 7 feet width, the lower part of oak, the upper part of aspen." One charred log of this monument was recovered by the surveyors in 1872; the rest of the monument had evidently been destroyed by forest fires or carried away by high water. (Report upon the Survey of the Boundary between the Territory of the United States and the Possessions of Great Britain from the Lake of the Woods to the Summit of the Rocky Mountains, by Archibald Campbell, United States Commissioner, pp. 305 and 307.)

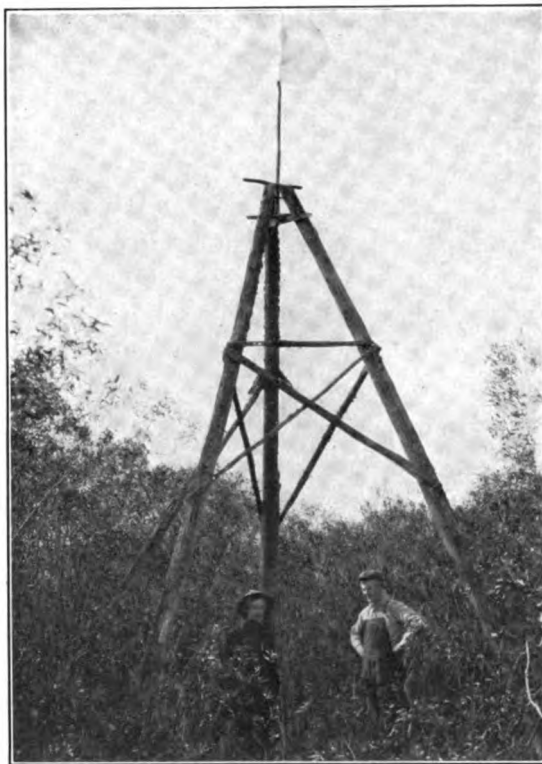
<sup>7</sup> Report upon the Survey of the Boundary between the Territory of the United States and the Possessions of Great Britain from the Lake of the Woods to the Summit of the Rocky Mountains, by Archibald Campbell, United States Commissioner, p. 35. Also U. S. Senate Executive Document No. 41, 44th Cong., 2d sess., p. 44.

The point as thus established was accepted as being on the site of the original Northwesternmost Point. Its geographic position computed through the triangulation done in 1912 was latitude  $49^{\circ}23'51''.70$ , longitude  $95^{\circ}09'11''.63$ . On the North American datum of 1927, the datum on which all the boundary triangulation, turning points, and monuments are based, the position of the point is latitude  $49^{\circ}23'51''.35$ , longitude  $95^{\circ}09'11''.36$ .

On a narrow tongue of land a few hundred feet west of the Northwesternmost Point the party found an old native-timber tripod which was a station mark left by the surveyors of the Boundary Commission of 1872-1876.<sup>8</sup> This tripod was tied in to the general scheme of triangulation, and its position relative to the Northwesternmost Point, as shown on the map on page 138, was found to check closely with that recorded in the manuscript copy of the report of the British Commissioner of the survey of 1872-1876, quoted in the footnote on this page. A photograph of the tripod as it appeared in 1912 will be found on this page.

As soon as the triangulation was completed and the location of the Northwesternmost Point determined, a detailed topographic and hydrographic survey, controlled by the triangulation, was made to accurately determine the location of the shore line of the northern part of the inlet and the course of the deep-water channel. This survey was made with plane table and stadia on a field scale of 400 feet to the inch. The deep-water channel was carefully sounded throughout its width and length with a graduated rod, and the positions of the soundings were determined with telescopic alidade and stadia from plane-table stations on the shore and plotted directly on the plane-table sheet at the time the soundings were taken. A photolithographic reproduction of this plane-table sheet showing the course of the channel as thus run out appears in map form on page 138.

The survey showed that the boundary channel was a well-defined open-water channel of a uniform width of about 60 feet; that it was from 2 to 3 feet deeper than the water on either side of it; that within a distance of less than 1 mile south of the Northwesternmost Point its winding course intersected the meridian boundary at



OLD TRIPOD AT HEAD OF NORTHWEST ANGLE INLET  
ERECTED BY BOUNDARY SURVEY OF 1872-76. PHOTOGRAPH TAKEN IN 1912

<sup>8</sup> A reference to this station, on p. 306 of the report of the United States Commissioner of the boundary survey of 1872-1876, shows that the tripod was erected by Capt. James F. Gregory, one of the engineers of the United States section of the Commission. The following reference, from a manuscript copy of the report of the British Commissioner of the same survey, further identifies the tripod as a station of the survey of 1872-1876 "A trigonometrical station 36 feet high was erected on the spit of land immediately to the west of the assumed N. W. Point, from which it bears North  $59^{\circ}09'$  West (true bearing) distant 377.3 feet."

five points; and that these intersecting lines of boundary, the meridian boundary and the line along the channel, enclosed between each intersection a small area of possibly indeterminate jurisdiction.

With the development of these facts, the southernmost of these points of intersection began to assume considerable importance. A signal was therefore erected at the point and its position was carefully determined by triangulation.<sup>9</sup> Later in 1912 the Commissioners, after carefully studying the situation, decided that they would permanently monument this point and that they would recommend to the two Governments that it be adopted in lieu of the original Northwesternmost Point so as to eliminate from the boundary line the intersecting portions north of this point.

This monumenting was done early the following spring. While the lake and the adjacent swamps were still frozen two cast-iron reference monuments and the materials for their concrete bases were transported on sleds from the railroad at Warroad, Minn., to Northwest Angle Inlet and were erected on the shores of the inlet, on either side of the southernmost point of intersection which had been carefully located and marked the year before. The monuments had been specially cast for the purpose. They were 8-foot hollow cast-iron posts,<sup>10</sup> and when set they projected 5 feet above their concrete bases, which were 2½ feet square, resting on a solid foundation below the frost line. Each monument bears the inscription "REFERENCE MARK" cast in raised letters on one side of the iron post. Before being set, each monument was filled with concrete to increase its durability and its resistance to forest fires.

The two reference monuments are designated No. 1 and No. 2. They are set on a straight line which passes through the point which they reference. Reference Monument No. 1 is 1,526 feet east of this point, and Reference Monument No. 2 is 1,268 feet west.<sup>11</sup>

The geographic positions of the reference monuments and the point which they reference were carefully determined by triangulation. The geographic positions of the reference monuments as thus determined were: Reference Monument No. 1, latitude 49°23'04''.50, longitude 95°08'48''.55; Reference Monument No. 2, latitude 49°23'04''.48, longitude 95°09'30''.77. The geographic position of the point which these monuments reference, as thus determined by triangulation, was latitude 49°23'04''.49, longitude 95°09'11''.61, which is the position of the point as later designated in the treaty of 1925. Expressed in terms of North American datum of 1927, the datum on which all points in this report are based, this position is latitude 49°23'04''.14, longitude 95°09'11''.34.<sup>11</sup> The point is 4,785 feet south of the original Northwesternmost Point and 2,522 feet north of Monument 925 of the meridian line. This point, adopted by the treaty of 1925 and established by the Commissioners, is the most northern point on the International Boundary between the United States and the Dominion of Canada.

<sup>9</sup> The position of the point of southernmost intersection (boundary turning point No. 1), as determined by the Commissioners and as later adopted by the treaty of 1925, is shown on Sheet No. 1 of the official maps of the section of the International Boundary from the Northwesternmost Point of Lake of the Woods to Lake Superior, and on Sheet No. 59 of the official maps of the section of the International Boundary from the Gulf of Georgia to the Northwesternmost Point of Lake of the Woods.

<sup>10</sup> See fig. 1, p. 116, and p. 118 for description.

<sup>11</sup> See Description and Definition of the Boundary Line, pp. 159 and 160.

## DESCRIPTION AND DEFINITION OF THE INTERNATIONAL BOUNDARY LINE FROM THE GULF OF GEORGIA (GEORGIA STRAIT) TO THE NORTHWESTERMOST POINT OF LAKE OF THE WOODS

The International Boundary Line between the United States and the Dominion of Canada from the Gulf of Georgia (Georgia Strait) to the Northwesternmost Point of Lake of the Woods as now reestablished is a series of straight-line courses which, taken together, closely approximate the astronomic parallel of forty-nine degrees of north latitude from the eastern shore of Georgia Strait to the turning point in Lake of the Woods, and a single straight-line course running due north from this turning point to the Northwesternmost Point of Lake of the Woods. It is primarily marked and defined by 926 boundary monuments, numbered consecutively from 0 to 925, and by 2 reference monuments at its terminus at the Northwesternmost Point of Lake of the Woods. The boundary is a straight line between each two consecutive monuments, between the turning point in Buffalo Bay of Lake of the Woods and the next of these monuments on either side thereof, and between the Northwesternmost Point of Lake of the Woods—as defined by the two reference monuments—and the first monument on line to the south.

In addition to these primary marks, the boundary has been marked under the provisions of the treaty of 1925 by 37 auxiliary marks—33 monuments designated by letters following the numbers, and 4 range marks. The 33 monuments have been placed on the straight-line courses between the primary monuments at places where the need for additional marks has developed. The four range marks have been erected to range the long straight-line course of the boundary across Boundary Bay between Monuments 4 and 5. Three of them mark points on this course of the boundary and the fourth is on the eastern prolongation of the course.

The total length of the line so reestablished and marked is 1,296.9 miles—1,270.2 miles along the parallel and 26.7 miles along the meridian or north-and-south line.

The description of the line, as reestablished by the Commissioners and as marked by them on the 59 boundary maps which accompany this report, is set forth in tabular form on pages 144 to 160, inclusive. The tables give the geographic positions of all the boundary monuments, the turning point, termini, and reference monuments, together with the lengths and azimuths of the connecting straight-line courses.

The lengths of the courses and other tabulated distances are given in meters, and the azimuths are reckoned clockwise from due south. All distances have been reduced to mean sea level. To obtain the actual horizontal distance between points of known elevation above sea level, the distances given in the tables should be increased by an amount equal to  $0.0000000478 L E$ , in which  $L$  is the tabulated length of the course in meters and  $E$  is the mean elevation of the ends of the course



in feet. The maximum value of this increase approaches 1 part in 2,300 on the highest elevations of this section of the boundary.

All latitudes and longitudes are given on the North American datum of 1927. This is the standard geodetic datum recently adopted by the United States Coast and Geodetic Survey for the United States and Alaska, and for the present in use by the Geodetic Survey of Canada for the extension of its triangulation northward in western Canada. It is the result of the readjustment of the network of arcs of first-order triangulation of the two countries, retaining the latitude and longitude of the station "Meades Ranch" of the former North American datum, but controlling the orientation of the new adjustment by many additional Laplace azimuths distributed throughout the network.<sup>1</sup> It supersedes the former North American datum.

<sup>1</sup> A geographic position is said to be on the North American datum of 1927 when the station is connected with the stations of the network of arcs of the readjusted first-order triangulation by continuous triangulation or traverse computed on the Clarke spheroid of 1866, as expressed in meters.

**GEOGRAPHIC POSITIONS OF MONUMENTS MARKING THE INTERNATIONAL BOUNDARY FROM THE GULF OF GEORGIA (GEORGIA STRAIT) TO THE NORTHWESTERNMOST POINT OF LAKE OF THE WOODS**

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
Mon. 0 (zero) (Initial point).	49 00 08.03 123 05 21.80	90 05 40	Offshore range mark <sup>1</sup> (west shore Point Roberts).	1,579.8	Offshore range mark <sup>1</sup> (east side Boundary Bay).	49 00 08.21 122 46 50.14	90 05 11	Offshore range mark (west side Boundary Bay).	17,440.0
		270 00 270 06	Mon. 1..... Shore range mark <sup>2</sup> (west shore Point Roberts).	98.45 94.30	Mon. 5.....	49 00 08.11 122 45 21.48	270 05 11 90 06 18	Mon. 5..... Offshore range mark (east side Boundary Bay).	1,801.9 1,801.9
Mon. 1.....	49 00 08.03 123 05 16.95	88 02	Shore range mark <sup>2</sup> (west shore Point Roberts).	4.15			269 57 56 270 06 18	Mon. 5-A..... Shore range mark <sup>4</sup> (east side Boundary Bay).	8.99 5.50
		90 00 269 57 30	Mon. 0 (zero)..... Mon. 2.....	98.45 1,027.8	Mon. 5-A.....	49 00 08.11 122 45 21.04	89 57 56 269 57 56	Mon. 5..... Mon. 5-B.....	8.99 14.13
Mon. 2.....	49 00 08.05 123 04 26.39	89 58 08 269 57 38	Mon. 1..... Mon. 2-A.....	1,027.8 504.26	Mon. 5-B.....	49 00 08.11 122 45 20.35	89 57 57 269 57 57	Mon. 5-A..... Mon. 5-C.....	14.13 63.19
Mon. 2-A.....	49 00 08.06 123 04 01.58	89 57 56 269 57 56	Mon. 2..... Mon. 2-B.....	504.26 27.11	Mon. 5-C.....	49 00 08.11 122 45 17.24	89 57 59 269 57 59	Mon. 5-B..... Mon. 5-D.....	63.19 13.92
Mon. 2-B.....	49 00 08.06 123 04 00.24	89 57 57 269 57 57	Mon. 2-A..... Mon. 3.....	27.11 491.85	Mon. 5-D.....	49 00 08.11 122 45 16.55	89 58 00 269 58 00	Mon. 5-C..... Mon. 5-E.....	13.92 1,468.7
Mon. 3.....	49 00 08.07 123 03 36.04	89 58 16 269 57 04	Mon. 2-B..... Mon. 3-A.....	491.85 1,694.7	Mon. 5-E.....	49 00 08.13 122 44 04.29	89 58 54 269 58 54	Mon. 5-D..... Mon. 5-F.....	1,468.7 48.25
Mon. 3-A.....	49 00 08.10 123 02 12.66	89 58 07 269 58 07	Mon. 3..... Mon. 3-B.....	1,694.7 18.06	Mon. 5-F.....	49 00 08.13 122 44 01.92	89 58 56 269 58 56	Mon. 5-E..... Mon. 6.....	48.25 340.8
Mon. 3-B.....	49 00 08.10 123 02 11.77	89 58 08 269 58 08	Mon. 3-A..... Mon. 4.....	18.06 122.19	Mon. 6.....	49 00 08.14 122 43 45.15	89 59 09 269 56 31	Mon. 5-F..... Mon. 7.....	340.8 1,208.0
Mon. 4.....	49 00 08.11 123 02 05.76	89 58 13 269 53 40	Mon. 3-B..... Shore range mark (west side Boundary Bay).	122.19 75.11	Mon. 7.....	49 00 08.17 122 42 45.72	89 57 16 269 56 28	Mon. 6..... Mon. 8.....	1,208.0 1,673.1
Shore range mark <sup>2</sup> (west side Boundary Bay).	49 00 08.11 123 02 02.07	89 53 43 269 53 43	Mon. 4..... Offshore range mark (west side Boundary Bay).	75.11 1,095.1	Mon. 8.....	49 00 08.22 122 41 23.40	89 57 30 269 56 34	Mon. 7..... Mon. 9.....	1,673.1 1,613.3
Offshore range mark <sup>3</sup> (west side Boundary Bay).	49 00 08.18 123 01 08.19	89 54 23 269 54 23	Shore range mark (west side Boundary Bay). Offshore range mark (east side Boundary Bay).	1,095.1 17,440.0	Mon. 9.....	49 00 08.26 122 40 04.03	89 57 34 269 56 09	Mon. 8..... Mon. 10.....	1,613.3 1,600.8
					Mon. 10.....	49 00 08.32 122 38 45.27	89 57 08 269 55 25	Mon. 9..... Mon. 11.....	1,600.8 517.9
					Mon. 11.....	49 00 08.34 122 38 19.79	89 55 44 269 56 38	Mon. 10..... Mon. 12.....	517.9 1,088.5
					Mon. 12.....	49 00 08.37 122 37 26.23	89 57 19 269 56 37	Mon. 11..... Mon. 13.....	1,088.5 1,690.0

<sup>1</sup> This range mark pertains to the boundary through Georgia Strait. It is included here as a reference. For geographic position see p. 160.

<sup>2</sup> This range mark is also a boundary mark.

<sup>4</sup> This range mark is on the prolongation of the boundary course Monument 4-Monument 5. For geographic position see p. 160.

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 13.....	49 00 08.41 122 36 03.08	89 57 40 269 53 34	Mon. 12..... Mon. 14.....	1,690.0 1,621.5	Mon. 42.....	49 00 09.31 122 06 30.83	90 00 50 270 04 13	Mon. 41..... Mon. 43.....	1,268.1 861.9
Mon. 14.....	49 00 08.50 122 34 43.31	89 54 34 269 56 14	Mon. 13..... Mon. 15.....	1,621.5 1,527.7	Mon. 43.....	49 00 09.27 122 05 48.42	90 04 45 271 11 26	Mon. 42..... Mon. 44.....	861.9 2,800.2
Mon. 15.....	49 00 08.55 122 33 28.14	89 57 10 269 54 54	Mon. 14..... Mon. 16.....	1,527.7 1,408.8	Mon. 44.....	49 00 07.37 122 03 30.68	91 13 09 271 13 12	Mon. 43..... Mon. 44-A.....	2,800.2 2,292.2
Mon. 16.....	49 00 08.61 122 32 18.83	89 55 46 269 55 49	Mon. 15..... Mon. 17.....	1,408.8 1,176.9	Mon. 44-A.....	49 00 05.77 122 01 37.94	91 14 37 271 14 37	Mon. 44..... Mon. 45.....	2,292.2 653.6
Mon. 17.....	49 00 08.66 122 31 20.93	89 56 33 269 56 06	Mon. 16..... Mon. 18.....	1,176.9 632.8	Mon. 45.....	49 00 05.31 122 01 05.78	91 15 02 271 14 40	Mon. 44-A..... Mon. 46.....	653.6 3,510.7
Mon. 18.....	49 00 08.68 122 30 49.80	89 56 30 269 55 56	Mon. 17..... Mon. 19.....	632.8 1,328.1	Mon. 46.....	49 00 02.81 121 58 13.10	91 16 50 271 16 39	Mon. 45..... Mon. 47.....	3,510.7 2,643.9
Mon. 19.....	49 00 08.72 122 29 44.45	89 56 46 269 55 33	Mon. 18..... Mon. 19-A.....	1,328.1 873.1	Mon. 47.....	49 00 00.88 121 56 03.06	91 18 17 271 18 47	Mon. 46..... Mon. 48.....	2,643.9 6,208.1
Mon. 19-A.....	49 00 08.76 122 29 01.50	89 56 02 269 56 02	Mon. 19..... Mon. 20.....	873.1 641.7	Mon. 48.....	48 59 56.16 121 50 57.72	91 22 37 271 22 29	Mon. 47..... Mon. 49.....	6,208.1 2,964.8
Mon. 20.....	49 00 08.78 122 28 29.93	89 56 29 269 54 56	Mon. 19-A..... Mon. 21.....	641.7 2,787.4	Mon. 49.....	48 59 53.83 121 48 31.91	91 24 19 271 24 26	Mon. 48..... Mon. 50.....	2,964.8 3,701.5
Mon. 21.....	49 00 08.89 122 26 12.79	89 56 40 269 57 02	Mon. 20..... Mon. 22.....	2,787.4 848.4	Mon. 50.....	48 59 50.85 121 45 29.87	91 26 43 270 01 36	Mon. 49..... Mon. 51.....	3,701.5 647.2
Mon. 22.....	49 00 08.91 122 25 31.05	89 57 34 269 58 50	Mon. 21..... Mon. 23.....	848.4 1,585.3	Mon. 51.....	48 59 50.84 121 44 58.03	90 02 00 269 59 06	Mon. 50..... Mon. 52.....	647.2 706.8
Mon. 23.....	49 00 08.92 122 24 13.06	89 59 49 269 57 06	Mon. 22..... Mon. 24.....	1,585.3 931.5	Mon. 52.....	48 59 50.85 121 44 23.26	89 59 32 268 49 19	Mon. 51..... Mon. 53.....	706.8 5,363.3
Mon. 24.....	49 00 08.94 122 23 27.23	89 57 41 269 56 54	Mon. 23..... Mon. 25.....	931.5 678.9	Mon. 53.....	48 59 54.33 121 39 59.46	88 52 38 268 49 00	Mon. 52..... Mon. 54.....	5,363.3 2,753.7
Mon. 25.....	49 00 08.96 122 22 53.82	89 57 19 269 55 29	Mon. 24..... Mon. 26.....	678.9 1,612.8	Mon. 54.....	48 59 56.15 121 37 44.01	88 50 42 268 58 14	Mon. 53..... Mon. 55.....	2,753.7 1,256.9
Mon. 26.....	49 00 09.02 122 21 34.48	89 56 29 269 56 48	Mon. 25..... Mon. 27.....	1,612.8 708.3	Mon. 55.....	48 59 56.88 121 36 42.19	88 59 01 269 25 48	Mon. 54..... Mon. 56.....	1,256.9 3,369.7
Mon. 27.....	49 00 09.04 122 20 59.63	89 57 15 269 56 14	Mon. 26..... Mon. 28.....	708.3 931.4	Mon. 56.....	48 59 57.93 121 33 56.42	89 27 53 269 27 31	Mon. 55..... Mon. 57.....	3,369.7 2,922.4
Mon. 28.....	49 00 09.08 122 20 13.80	89 56 48 269 56 46	Mon. 27..... Mon. 29.....	931.4 1,406.9	Mon. 57.....	48 59 58.80 121 31 32.65	89 29 19 269 50 06	Mon. 56..... Mon. 58.....	2,922.4 257.0
Mon. 29.....	49 00 09.11 122 19 04.59	89 57 38 269 55 26	Mon. 28..... Mon. 30.....	1,406.9 1,881.0	Mon. 58.....	48 59 58.82 121 31 20.01	89 50 15 269 36 57	Mon. 57..... Mon. 59.....	257.0 1,916.5
Mon. 30.....	49 00 09.18 122 17 32.04	89 56 36 269 56 03	Mon. 29..... Mon. 31.....	1,881.0 1,752.0	Mon. 59.....	48 59 59.23 121 29 45.72	89 38 08 269 37 56	Mon. 58..... Mon. 60.....	1,916.5 1,640.0
Mon. 31 *.....	49 00 09.24 122 16 05.84	89 57 08 269 56 48	Mon. 30..... Mon. 31-A.....	1,752.0 310.9	Mon. 60.....	48 59 59.56 121 28 25.04	89 38 57 269 39 03	Mon. 59..... Mon. 61.....	1,640.0 2,184.1
Mon. 31-A.....	49 00 09.25 122 15 50.54	89 56 59 269 56 59	Mon. 31..... Mon. 31-B.....	310.9 37.00	Mon. 61.....	48 59 59.98 121 26 37.59	89 40 24 269 40 48	Mon. 60..... Mon. 62.....	2,184.1 2,141.4
Mon. 31-B.....	49 00 09.25 122 15 48.72	89 57 00 269 57 00	Mon. 31-A..... Mon. 32.....	37.00 951.2	Mon. 62.....	49 00 00.35 121 24 52.24	89 42 08 269 57 37	Mon. 61..... Mon. 63.....	2,141.4 779.8
Mon. 32.....	49 00 09.28 122 15 01.92	89 57 36 269 56 18	Mon. 31-B..... Mon. 33.....	951.2 1,353.9	Mon. 63.....	49 00 00.37 121 24 13.88	89 58 06 268 45 43	Mon. 62..... Mon. 64.....	779.8 1,914.3
Mon. 33.....	49 00 09.32 122 13 55.31	89 57 08 269 59 36	Mon. 32..... Mon. 34.....	1,353.9 184.6	Mon. 64.....	49 00 01.70 121 22 39.72	88 46 54 268 48 20	Mon. 63..... Mon. 65.....	1,914.3 3,227.9
Mon. 34.....	49 00 09.32 122 13 46.23	89 59 42 269 56 32	Mon. 33..... Mon. 35.....	184.6 1,100.0	Mon. 65.....	49 00 03.84 121 20 00.94	88 50 20 270 03 06	Mon. 64..... Mon. 66.....	3,227.9 2,425.5
Mon. 35.....	49 00 09.35 122 12 52.11	89 57 13 270 01 01	Mon. 34..... Mon. 36.....	1,100.0 1,063.6	Mon. 66.....	49 00 03.76 121 18 01.61	90 04 37 269 52 35	Mon. 65..... Mon. 67.....	2,425.5 300.9
Mon. 36.....	49 00 09.34 122 11 59.78	90 01 41 270 00 48	Mon. 35..... Mon. 37.....	1,063.6 1,126.6	Mon. 67.....	49 00 03.78 121 17 46.81	89 52 46 270 13 02	Mon. 66..... Mon. 68.....	300.9 3,393.8
Mon. 37.....	49 00 09.33 122 11 04.35	90 01 29 269 59 49	Mon. 36..... Mon. 38.....	1,126.6 1,780.1	Mon. 68.....	49 00 03.33 121 14 59.84	90 15 08 270 17 01	Mon. 67..... Mon. 69.....	3,393.8 4,167.3
Mon. 38.....	49 00 09.32 122 09 36.77	90 00 55 270 00 08	Mon. 37..... Mon. 39.....	1,780.1 974.2	Mon. 69.....	49 00 02.61 121 11 34.82	90 19 36 270 16 58	Mon. 68..... Mon. 70.....	4,167.3 2,873.8
Mon. 39.....	49 00 09.32 122 08 48.84	90 00 44 269 59 42	Mon. 38..... Mon. 40.....	974.2 538.1	Mon. 70.....	49 00 02.12 121 09 13.43	90 18 44 270 18 16	Mon. 69..... Mon. 71.....	2,873.8 4,424.2
Mon. 40.....	49 00 09.32 122 08 22.36	90 00 02 270 00 04	Mon. 39..... Mon. 41.....	538.1 998.9	Mon. 71.....	49 00 01.31 121 05 35.77	90 21 00 269 59 21	Mon. 70..... Mon. 72.....	4,424.2 2,333.1
Mon. 41.....	49 00 09.31 122 07 33.22	90 00 41 270 00 03	Mon. 40..... Mon. 42.....	998.9 1,268.1	Mon. 72.....	49 00 01.30 121 03 40.98	90 00 48 269 53 22	Mon. 71..... Mon. 73.....	2,333.1 3,158.1

\*A bronze disk stamped "CANADA—UNITED STATES, 30-A", set flush with the ground in the top of a concrete pier, is 37.44 meters from Monument 31 in azimuth 89° 57'08".

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
Mon. 73.....	49° 00' 01.47 121° 01' 05.61	89° 55' 19 269° 54' 59	Mon. 72..... Mon. 74.....	3,158.1 1,371.5	Mon. 105.....	48° 59' 59.91 119° 52' 41.14	89° 47' 36 269° 47' 22	Mon. 104..... Mon. 106.....	4,246.1 2,665.2
Mon. 74.....	49° 00' 01.53 120° 59' 58.14	89° 55' 50 269° 55' 54	Mon. 73..... Mon. 75.....	1,371.5 3,390.3	Mon. 106.....	49° 00' 00.20 119° 50' 30.02	89° 49' 01 269° 49' 05	Mon. 105..... Mon. 107.....	2,665.2 3,922.5
Mon. 75.....	49° 00' 01.63 120° 57' 11.34	89° 58' 00 269° 58' 10	Mon. 74..... Mon. 76.....	3,390.3 3,207.5	Mon. 107.....	49° 00' 00.56 119° 47' 17.04	89° 51' 30 269° 51' 31	Mon. 106..... Mon. 108.....	3,922.5 2,340.5
Mon. 76.....	49° 00' 01.65 120° 54' 33.54	90° 00' 09 270° 00' 04	Mon. 75..... Mon. 77.....	3,207.5 3,641.6	Mon. 108.....	49° 00' 00.73 119° 45' 21.90	89° 52' 58 269° 53' 06	Mon. 107..... Mon. 109.....	2,340.5 1,916.6
Mon. 77.....	49° 00' 01.61 120° 51' 34.38	90° 02' 19 270° 02' 06	Mon. 76..... Mon. 78.....	3,641.6 4,292.4	Mon. 109.....	49° 00' 00.84 119° 43' 47.60	89° 54' 17 269° 59' 45	Mon. 108..... Mon. 110.....	1,916.6 2,198.6
Mon. 78.....	49° 00' 01.48 120° 48' 03.20	90° 04' 45 270° 05' 04	Mon. 77..... Mon. 79.....	4,292.4 2,964.4	Mon. 110.....	49° 00' 00.84 119° 41' 59.44	90° 01' 07 270° 00' 06	Mon. 109..... Mon. 111.....	2,198.6 764.3
Mon. 79.....	49° 00' 01.31 120° 45' 37.36	90° 06' 54 270° 06' 38	Mon. 78..... Mon. 80.....	2,964.4 4,516.9	Mon. 111.....	49° 00' 00.83 119° 41' 21.84	90° 00' 34 269° 59' 37	Mon. 110..... Mon. 112.....	764.3 2,664.0
Mon. 80.....	49° 00' 00.97 120° 41' 55.14	90° 09' 26 270° 10' 17	Mon. 79..... Mon. 81.....	4,516.9 1,119.2	Mon. 112.....	49° 00' 00.82 119° 39' 10.77	90° 01' 16 270° 01' 08	Mon. 111..... Mon. 113.....	2,664.0 1,345.2
Mon. 81.....	49° 00' 00.85 120° 41' 00.08	90° 10' 59 269° 59' 01	Mon. 80..... Mon. 82.....	1,119.2 1,098.7	Mon. 113.....	49° 00' 00.80 119° 38' 04.59	90° 01' 58 269° 58' 34	Mon. 112..... Mon. 114.....	1,345.2 4,026.9
Mon. 82.....	49° 00' 00.86 120° 40' 06.02	89° 59' 42 269° 35' 27	Mon. 81..... Mon. 83.....	1,098.7 1,781.2	Mon. 114.....	49° 00' 00.81 119° 34' 46.48	90° 01' 04 269° 58' 34	Mon. 113..... Mon. 115.....	4,026.9 4,183.2
Mon. 83.....	49° 00' 01.26 120° 38' 38.39	89° 36' 33 269° 36' 32	Mon. 82..... Mon. 84.....	1,781.2 3,543.6	Mon. 115.....	49° 00' 00.82 119° 31' 20.18	90° 01' 09 270° 03' 52	Mon. 114..... Mon. 116.....	4,183.2 1,314.5
Mon. 84.....	49° 00' 02.01 120° 35' 44.05	89° 38' 44 269° 38' 43	Mon. 83..... Mon. 85.....	3,543.6 2,730.5	Mon. 116.....	49° 00' 00.76 119° 30' 15.51	90° 04' 41 269° 59' 35	Mon. 115..... Mon. 116-A.....	1,314.5 3,162.0
Mon. 85.....	49° 00' 02.54 120° 33' 29.72	89° 40' 24 270° 00' 40	Mon. 84..... Mon. 86.....	2,730.5 566.8	Mon. 116-A.....	49° 00' 00.75 119° 27' 39.94	90° 01' 32 270° 01' 32	Mon. 116..... Mon. 116-B.....	3,162.0 17.78
Mon. 86.....	49° 00' 02.53 120° 33' 01.83	90° 01' 01 269° 59' 51	Mon. 85..... Mon. 87.....	566.8 1,963.1	Mon. 116-B.....	49° 00' 00.75 119° 27' 39.07	90° 01' 33 270° 01' 33	Mon. 116-A..... Mon. 117.....	17.78 142.3
Mon. 87.....	49° 00' 02.52 120° 31' 25.25	90° 01' 04 270° 01' 13	Mon. 86..... Mon. 88.....	1,963.1 3,131.8	Mon. 117.....	49° 00' 00.74 119° 27' 32.07	90° 01' 38 269° 59' 36	Mon. 116-B..... Mon. 118.....	142.3 2,293.9
Mon. 88.....	49° 00' 02.46 120° 28' 51.17	90° 03' 10 270° 02' 46	Mon. 87..... Mon. 89.....	3,131.8 3,852.0	Mon. 118.....	49° 00' 00.74 119° 25' 39.21	90° 01' 01 269° 59' 09	Mon. 117..... Mon. 119.....	2,293.9 1,890.5
Mon. 89.....	49° 00' 02.31 120° 25' 41.66	90° 05' 09 270° 05' 20	Mon. 88..... Mon. 90.....	3,852.0 1,943.3	Mon. 119.....	49° 00' 00.74 119° 24' 06.20	90° 00' 19 269° 58' 05	Mon. 118..... Mon. 120.....	1,890.5 1,512.3
Mon. 90.....	49° 00' 02.21 120° 24' 06.05	90° 06' 32 270° 06' 40	Mon. 89..... Mon. 91.....	1,943.3 4,047.1	Mon. 120.....	49° 00' 00.76 119° 22' 51.80	89° 59' 01 270° 00' 21	Mon. 119..... Mon. 121.....	1,512.3 2,986.8
Mon. 91.....	49° 00' 01.90 120° 20' 46.94	90° 09' 10 270° 09' 08	Mon. 90..... Mon. 92.....	4,047.1 1,616.0	Mon. 121.....	49° 00' 00.73 119° 20' 24.85	90° 02' 12 269° 59' 31	Mon. 120..... Mon. 122.....	2,986.8 2,197.0
Mon. 92.....	49° 00' 01.76 120° 19' 27.44	90° 10' 08 270° 09' 55	Mon. 91..... Mon. 93.....	1,616.0 3,073.9	Mon. 122.....	49° 00' 00.72 119° 18' 36.76	90° 00' 53 270° 00' 29	Mon. 121..... Mon. 123.....	2,197.0 3,350.7
Mon. 93.....	49° 00' 01.44 120° 16' 56.21	90° 11' 49 270° 12' 12	Mon. 92..... Mon. 94.....	3,073.9 4,304.1	Mon. 123.....	49° 00' 00.68 119° 15' 51.91	90° 02' 34 269° 59' 22	Mon. 122..... Mon. 124.....	3,350.7 3,033.7
Mon. 94.....	49° 00' 00.90 120° 13' 24.46	90° 14' 51 270° 14' 39	Mon. 93..... Mon. 95.....	4,304.1 3,134.2	Mon. 124.....	49° 00' 00.67 119° 13' 22.66	90° 01' 15 269° 59' 07	Mon. 123..... Mon. 125.....	3,033.7 2,055.4
Mon. 95.....	49° 00' 00.43 120° 10' 50.27	90° 16' 36 270° 16' 20	Mon. 94..... Mon. 96.....	3,134.2 2,896.4	Mon. 125.....	49° 00' 00.67 119° 11' 41.54	90° 00' 23 269° 58' 31	Mon. 124..... Mon. 126.....	2,055.4 939.5
Mon. 96.....	48° 59' 59.96 120° 08' 27.77	90° 18' 07 270° 18' 16	Mon. 95..... Mon. 97.....	2,896.4 4,221.4	Mon. 126.....	49° 00' 00.88 119° 10' 55.32	89° 37' 06 270° 10' 34	Mon. 125..... Mon. 127.....	939.5 1,877.6
Mon. 97.....	48° 59' 59.19 120° 05' 00.09	90° 20' 53 270° 21' 02	Mon. 96..... Mon. 98.....	4,221.4 1,873.8	Mon. 127.....	49° 00' 00.68 119° 09' 22.94	90° 11' 44 269° 58' 14	Mon. 126..... Mon. 128.....	1,877.6 2,101.9
Mon. 98.....	48° 59' 58.80 120° 03' 27.91	90° 22' 12 270° 22' 10	Mon. 97..... Mon. 99.....	1,873.8 1,585.4	Mon. 128.....	49° 00' 00.70 119° 07' 39.53	89° 59' 32 269° 58' 45	Mon. 127..... Mon. 129.....	2,101.9 2,011.9
Mon. 99.....	48° 59' 58.47 120° 02' 09.91	90° 23' 08 269° 56' 30	Mon. 98..... Mon. 100.....	1,585.4 944.8	Mon. 129.....	49° 00' 00.71 119° 06' 00.55	90° 00' 00 270° 01' 03	Mon. 128..... Mon. 130.....	2,011.9 1,976.9
Mon. 100.....	48° 59' 58.50 120° 01' 23.43	89° 57' 05 269° 51' 14	Mon. 99..... Mon. 101.....	944.8 1,600.3	Mon. 130.....	49° 00' 00.68 119° 04' 23.30	90° 02' 16 270° 01' 05	Mon. 129..... Mon. 131.....	1,976.9 1,988.8
Mon. 101.....	48° 59' 58.62 120° 00' 04.70	89° 52' 13 269° 42' 08	Mon. 100..... Mon. 102.....	1,600.3 1,615.6	Mon. 131.....	49° 00' 00.65 119° 02' 45.45	90° 02' 19 269° 58' 37	Mon. 130..... Mon. 132.....	1,988.8 2,211.7
Mon. 102.....	48° 59' 58.88 119° 58' 45.22	89° 43' 08 269° 42' 57	Mon. 101..... Mon. 103.....	1,615.6 2,568.7	Mon. 132.....	49° 00' 00.66 119° 00' 56.64	89° 59' 59 269° 58' 08	Mon. 131..... Mon. 133.....	2,211.7 3,133.9
Mon. 103.....	48° 59' 59.28 119° 56' 38.84	89° 44' 33 269° 45' 15	Mon. 102..... Mon. 104.....	2,568.7 585.6	Mon. 133.....	49° 00' 00.69 118° 58' 22.46	90° 00' 05 269° 58' 18	Mon. 132..... Mon. 134.....	3,133.9 1,237.0
Mon. 104.....	48° 59' 59.36 119° 56' 10.04	89° 45' 36 269° 44' 59	Mon. 103..... Mon. 105.....	585.6 4,246.1	Mon. 134.....	49° 00' 00.71 118° 57' 21.60	89° 59' 04 270° 00' 20	Mon. 133..... Mon. 135.....	1,237.0 1,061.8

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
Mon. 135.....	49 00 00.70 118 56 29.36	90 01 00 269 59 06	Mon. 134..... Mon. 136.....	1,061.8 2,370.1	Mon. 165-B....	49 00 00.62 118 13 21.53	90 00 35 270 00 35	Mon. 165-A..... Mon. 166.....	21.34 1,184.2
Mon. 136.....	49 00 00.70 118 54 32.76	90 00 34 269 54 21	Mon. 135..... Mon. 137.....	2,370.1 801.2	Mon. 166.....	49 00 00.61 118 12 23.27	90 01 19 269 59 18	Mon. 165-B..... Mon. 167.....	1,184.2 2,524.7
Mon. 137.....	49 00 00.74 118 53 53.34	89 54 51 270 06 04	Mon. 136..... Mon. 138.....	801.2 1,410.8	Mon. 167.....	49 00 00.60 118 10 19.06	90 00 52 269 58 32	Mon. 166..... Mon. 168.....	2,524.7 650.7
Mon. 138.....	49 00 00.66 118 52 43.94	90 06 56 269 58 20	Mon. 137..... Mon. 139.....	1,410.8 3,342.2	Mon. 168.....	49 00 00.61 118 09 47.05	89 58 56 269 51 59	Mon. 167..... Mon. 169.....	650.7 5,047.6
Mon. 139.....	49 00 00.68 118 49 59.51	90 00 24 269 59 34	Mon. 138..... Mon. 140.....	3,342.2 2,278.6	Mon. 169.....	49 00 00.92 118 05 38.72	89 55 06 269 52 27	Mon. 168..... Mon. 170.....	5,047.6 2,391.2
Mon. 140.....	49 00 00.67 118 48 07.41	90 00 58 269 56 01	Mon. 139..... Mon. 141.....	2,278.6 1,149.8	Mon. 170.....	49 00 01.07 118 05 41.08	89 53 56 269 53 09	Mon. 169..... Mon. 171.....	2,391.2 1,721.2
Mon. 141.....	49 00 00.71 118 47 10.84	89 56 44 270 03 31	Mon. 140..... Mon. 142.....	1,149.8 765.6	Mon. 171.....	49 00 01.17 118 02 16.40	89 54 13 269 51 42	Mon. 170..... Mon. 172.....	1,721.2 3,430.7
Mon. 142.....	49 00 00.68 118 46 33.17	90 03 59 269 59 49	Mon. 141..... Mon. 143.....	765.6 1,269.6	Mon. 172.....	49 00 01.41 117 59 27.61	89 53 49 269 51 34	Mon. 171..... Mon. 173.....	3,430.7 4,309.3
Mon. 143.....	49 00 00.68 118 45 30.72	90 00 36 270 00 59	Mon. 142..... Mon. 144.....	1,269.6 903.9	Mon. 173.....	49 00 01.70 117 55 55.61	89 54 14 269 54 17	Mon. 172..... Mon. 174.....	4,309.3 2,860.0
Mon. 144.....	49 00 00.67 118 44 46.24	90 01 32 270 00 10	Mon. 143..... Mon. 145.....	903.9 914.9	Mon. 174.....	49 00 01.82 117 53 34.90	89 56 03 269 52 34	Mon. 173..... Mon. 174-A.....	2,860.0 4,563.6
Mon. 145.....	49 00 00.67 118 44 01.23	90 00 44 269 59 46	Mon. 144..... Mon. 146.....	914.9 952.9	Mon. 174-A....	49 00 02.08 117 49 50.38	89 55 24 269 55 24	Mon. 174..... Mon. 174-B.....	4,563.6 17.54
Mon. 146.....	49 00 00.67 118 43 14.35	90 00 22 270 01 44	Mon. 145..... Mon. 147.....	952.9 1,069.8	Mon. 174-B....	49 00 02.08 117 49 49.52	89 55 24 269 55 24	Mon. 174-A..... Mon. 175.....	17.54 26.11
Mon. 147.....	49 00 00.65 118 42 21.72	90 02 24 270 02 39	Mon. 146..... Mon. 148.....	1,069.8 1,306.2	Mon. 175.....	49 00 02.08 117 49 48.23	89 55 25 269 55 40	Mon. 174-B..... Mon. 176.....	26.11 4,224.8
Mon. 148.....	49 00 00.61 118 41 17.46	90 03 28 269 56 45	Mon. 147..... Mon. 149.....	1,306.2 1,716.9	Mon. 176.....	49 00 02.21 117 46 20.38	89 58 17 269 48 44	Mon. 175..... Mon. 177.....	4,224.8 2,615.8
Mon. 149.....	49 00 00.65 118 39 52.99	89 57 49 270 00 17	Mon. 148..... Mon. 150.....	1,716.9 2,052.5	Mon. 177.....	49 00 02.46 117 44 11.68	89 50 22 269 50 43	Mon. 176..... Mon. 178.....	2,615.8 2,942.4
Mon. 150.....	49 00 00.64 118 38 12.01	90 01 33 269 58 53	Mon. 149..... Mon. 151.....	2,052.5 3,612.9	Mon. 178.....	49 00 02.70 117 41 46.92	89 52 32 269 54 24	Mon. 177..... Mon. 179.....	2,942.4 2,948.7
Mon. 151.....	49 00 00.64 118 35 14.26	90 01 07 269 59 47	Mon. 150..... Mon. 152.....	3,612.9 2,727.5	Mon. 179.....	49 00 02.82 117 39 21.85	89 56 14 269 50 36	Mon. 178..... Mon. 180.....	2,948.7 1,439.4
Mon. 152.....	49 00 00.62 118 33 00.07	90 01 28 269 58 32	Mon. 151..... Mon. 153.....	2,727.5 1,791.4	Mon. 180.....	49 00 02.95 117 38 11.04	89 51 30 269 59 31	Mon. 179..... Mon. 181.....	1,439.4 724.7
Mon. 153.....	49 00 00.64 118 31 31.94	89 59 38 269 59 06	Mon. 152..... Mon. 154.....	1,791.4 1,592.4	Mon. 181.....	49 00 02.95 117 37 35.38	89 59 58 270 02 51	Mon. 180..... Mon. 182.....	724.7 3,463.2
Mon. 154.....	49 00 00.64 118 30 13.60	90 00 05 270 00 23	Mon. 153..... Mon. 155.....	1,592.4 805.8	Mon. 182.....	49 00 02.82 117 34 45.00	90 05 00 270 05 01	Mon. 181..... Mon. 183.....	3,463.2 5,253.5
Mon. 155.....	49 00 00.64 118 29 33.95	90 00 53 269 57 23	Mon. 154..... Mon. 156.....	805.8 1,970.3	Mon. 183.....	49 00 02.49 117 30 26.54	90 06 16 270 07 52	Mon. 182..... Mon. 184.....	5,253.5 5,800.5
Mon. 156.....	49 00 00.67 118 27 57.02	89 58 36 269 56 58	Mon. 155..... Mon. 157.....	1,970.3 1,032.2	Mon. 184.....	49 00 01.96 117 25 41.17	90 11 28 270 12 07	Mon. 183..... Mon. 185.....	5,800.5 2,798.0
Mon. 157.....	49 00 00.70 118 27 06.24	89 57 36 270 03 14	Mon. 156..... Mon. 158.....	1,032.2 2,195.9	Mon. 185.....	49 00 01.62 117 23 23.51	90 13 51 270 14 02	Mon. 184..... Mon. 186.....	2,798.0 1,622.8
Mon. 158.....	49 00 00.62 118 25 18.21	90 04 36 270 03 21	Mon. 157..... Mon. 159.....	2,195.9 2,425.9	Mon. 186.....	49 00 01.40 117 22 03.67	90 15 03 269 57 29	Mon. 185..... Mon. 187.....	1,622.8 1,012.3
Mon. 159.....	49 00 00.52 118 23 18.86	90 04 51 269 49 19	Mon. 158..... Mon. 160.....	2,425.9 910.4	Mon. 187.....	49 00 01.42 117 21 13.87	89 58 07 270 02 02	Mon. 186..... Mon. 188.....	1,012.3 214.6
Mon. 160.....	49 00 00.61 118 22 34.07	89 49 53 269 58 36	Mon. 159..... Mon. 161.....	910.4 3,809.5	Mon. 188.....	49 00 01.42 117 21 03.31	90 02 10 270 32 56	Mon. 187..... Mon. 188-A.....	214.6 3,821.3
Mon. 161.....	49 00 00.62 118 19 26.65	90 00 57 270 01 45	Mon. 160..... Mon. 162.....	3,809.5 2,808.2	Mon. 188-A....	49 00 00.19 117 17 55.32	90 35 18 270 35 18	Mon. 188..... Mon. 188-B.....	3,821.3 24.55
Mon. 162.....	49 00 00.55 118 17 08.49	90 03 29 269 57 42	Mon. 161..... Mon. 163.....	2,808.2 2,854.7	Mon. 188-B....	49 00 00.18 117 17 54.11	90 35 19 270 35 19	Mon. 188-A..... Mon. 189.....	24.55 683.2
Mon. 163.....	49 00 00.59 118 14 48.05	89 59 28 269 57 24	Mon. 162..... Mon. 164.....	2,854.7 1,274.0	Mon. 189.....	48 59 59.95 117 17 20.50	90 35 44 270 33 39	Mon. 188-B..... Mon. 190.....	683.2 3,293.9
Mon. 164.....	49 00 00.62 118 13 45.37	89 58 11 270 00 17	Mon. 163..... Mon. 165.....	1,274.0 437.6	Mon. 190.....	48 59 58.88 117 14 38.46	90 35 41 270 35 22	Mon. 189..... Mon. 191.....	3,293.9 3,276.0
Mon. 165.....	49 00 00.62 118 13 23.84	90 00 33 270 00 33	Mon. 164..... Mon. 165-A.....	437.6 25.65	Mon. 191.....	48 59 57.76 117 11 57.30	90 37 23 270 37 50	Mon. 190..... Mon. 192.....	3,276.0 3,592.7
Mon. 165-A....	49 00 00.62 118 13 22.58	90 00 34 270 00 34	Mon. 165..... Mon. 165-B.....	25.65 21.34	Mon. 192.....	48 59 56.44 117 09 00.56	90 40 03 270 42 05	Mon. 191..... Mon. 193.....	3,592.7 1,195.2

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 193.....	48 59 55.96 117 08 01.76	90 42 50 269 37 49	Mon. 192.....	1,195.2	Mon. 223.....	49 00 03.54 115 58 16.08	89 55 22 269 55 28	Mon. 222.....	4,409.7
Mon. 194.....	48 59 56.85 117 04 17.79	89 40 38 269 40 10	Mon. 194.....	4,552.8	Mon. 224.....	49 00 03.66 115 55 08.89	89 57 50 269 56 27	Mon. 224.....	3,804.9
Mon. 195.....	48 59 57.42 117 01 39.71	89 42 09 269 42 02	Mon. 195.....	3,213.2	Mon. 225.....	49 00 03.71 115 53 31.14	89 57 41 269 56 36	Mon. 225.....	1,986.8
Mon. 196.....	48 59 57.87 116 59 24.16	89 43 45 269 44 09	Mon. 196.....	3,213.2	Mon. 226.....	49 00 03.71 115 51 37.56	89 57 41 270 01 05	Mon. 226.....	1,986.8
Mon. 197.....	48 59 58.48 116 55 39.99	89 46 59 269 47 05	Mon. 197.....	2,755.2	Mon. 227.....	49 00 03.60 115 47 53.09	90 03 54 270 03 10	Mon. 227.....	2,308.5
Mon. 198.....	48 59 58.82 116 53 15.06	89 48 54 269 48 42	Mon. 198.....	4,556.7	Mon. 228.....	49 00 03.51 115 45 56.42	90 04 38 270 04 58	Mon. 228.....	4,562.5
Mon. 199.....	48 59 59.23 116 49 38.42	89 51 26 269 50 51	Mon. 199.....	4,403.4	Mon. 229.....	49 00 03.36 115 43 39.02	90 06 42 270 06 33	Mon. 229.....	2,792.7
Mon. 200.....	48 59 59.46 116 47 15.02	89 52 39 269 53 04	Mon. 200.....	2,914.9	Mon. 230.....	49 00 03.18 115 41 30.04	90 08 10 270 08 18	Mon. 230.....	2,621.8
Mon. 201.....	48 59 59.60 116 45 15.46	89 54 34 269 54 34	Mon. 201.....	2,430.2	Mon. 231.....	49 00 02.94 115 39 15.41	90 09 59 269 59 48	Mon. 231.....	2,736.4
Mon. 202.....	48 59 59.69 116 43 34.95	89 55 50 269 55 41	Mon. 202.....	2,043.0	Mon. 232.....	49 00 02.94 115 38 53.32	90 09 59 270 01 24	Mon. 232.....	448.9
Mon. 203.....	48 59 59.76 116 41 57.78	89 56 54 269 57 17	Mon. 203.....	1,975.2	Mon. 233.....	49 00 02.94 115 38 38.91	90 01 34 269 59 51	Mon. 233.....	292.9
Mon. 204.....	48 59 59.81 116 39 02.96	89 59 29 269 59 18	Mon. 204.....	3,553.4	Mon. 234.....	49 00 02.94 115 37 57.78	90 01 34 270 09 25	Mon. 234.....	836.2
Mon. 205.....	48 59 59.80 116 36 22.61	90 01 19 270 02 00	Mon. 205.....	3,259.3	Mon. 235.....	49 00 02.52 115 34 35.88	90 11 58 270 10 15	Mon. 235.....	4,103.7
Mon. 206.....	48 59 59.75 116 34 32.26	90 03 23 269 57 47	Mon. 206.....	2,243.1	Mon. 236.....	49 00 02.05 115 31 03.73	90 12 55 270 12 40	Mon. 236.....	4,312.2
Mon. 207.....	48 59 59.77 116 29 53.45	90 01 18 269 55 02	Mon. 207.....	5,667.1	Mon. 237.....	49 00 01.54 115 27 50.42	90 15 06 270 14 56	Mon. 237.....	3,929.3
Mon. 208.....	49 00 00.75 116 26 17.65	89 37 45 269 38 17	Mon. 208.....	4,386.4	Mon. 238.....	49 00 00.95 115 24 38.41	90 15 06 270 17 15	Mon. 238.....	3,903.8
Mon. 209.....	49 00 01.35 116 23 44.81	89 40 12 269 39 30	Mon. 209.....	3,106.6	Mon. 239.....	49 00 00.28 115 21 30.96	90 17 15 270 19 51	Mon. 239.....	3,810.2
Mon. 210.....	49 00 02.01 116 20 49.22	89 41 42 269 41 39	Mon. 210.....	3,569.2	Mon. 240.....	48 59 59.38 115 17 48.00	90 19 37 270 22 50	Mon. 240.....	4,531.9
Mon. 211.....	49 00 02.27 116 19 32.82	89 42 36 269 43 02	Mon. 211.....	1,552.9	Mon. 241.....	48 59 58.81 115 15 41.56	90 22 40 269 58 15	Mon. 241.....	2,569.9
Mon. 212.....	49 00 02.81 116 16 35.22	89 45 16 269 44 55	Mon. 212.....	3,610.0	Mon. 242.....	48 59 58.83 115 13 37.31	90 24 25 270 00 13	Mon. 242.....	2,525.5
Mon. 213.....	49 00 03.20 116 14 10.30	89 46 44 270 35 50	Mon. 213.....	2,945.6	Mon. 243.....	48 59 58.79 115 10 56.49	89 59 49 269 59 56	Mon. 243.....	3,268.9
Mon. 214.....	49 00 02.60 116 12 44.62	90 36 54 270 31 35	Mon. 214.....	1,741.6	Mon. 244.....	48 59 58.79 115 10 16.72	90 02 14 270 00 14	Mon. 244.....	808.4
Mon. 215.....	49 00 02.18 116 11 35.21	90 32 27 269 57 02	Mon. 215.....	1,410.9	Mon. 245.....	48 59 58.79 115 09 56.98	90 00 26 269 57 35	Mon. 245.....	401.4
Mon. 216.....	49 00 02.20 116 10 53.82	89 57 33 269 57 49	Mon. 216.....	841.2	Mon. 246.....	48 59 58.83 115 06 28.28	90 00 29 270 00 32	Mon. 246.....	401.4
Mon. 216-A.....	49 00 02.20 116 10 48.96	89 57 52 269 57 52	Mon. 216-A.....	98.82	Mon. 247.....	48 59 58.77 115 05 15.57	90 00 13 269 59 35	Mon. 247.....	4,242.0
Mon. 216-B.....	49 00 02.20 116 10 47.93	89 57 53 269 57 53	Mon. 216-B.....	20.93	Mon. 248.....	48 59 59.53 114 59 47.81	90 02 58 269 42 06	Mon. 248.....	3,917.1
Mon. 217.....	49 00 02.20 116 10 38.82	89 58 00 269 30 33	Mon. 217.....	185.05	Mon. 249.....	48 59 59.83 114 58 17.50	89 42 12 269 43 13	Mon. 249.....	4,223.1
Mon. 218.....	49 00 02.21 116 10 37.50	89 30 34 269 46 24	Mon. 218.....	28.84	Mon. 250.....	49 00 00.36 114 55 19.74	89 43 17 269 45 28	Mon. 250.....	1,835.7
Mon. 219.....	49 00 02.56 116 08 15.19	89 48 13 269 47 40	Mon. 219.....	2,892.7	Mon. 251.....	49 00 00.77 114 52 42.71	89 45 27 269 47 25	Mon. 251.....	3,613.2
Mon. 220.....	49 00 02.80 116 06 28.15	89 49 00 269 47 52	Mon. 220.....	2,175.8	Mon. 252.....	49 00 01.00 114 51 00.19	89 47 27 269 49 02	Mon. 252.....	3,191.8
Mon. 221.....	49 00 03.15 116 03 40.58	89 49 59 269 52 47	Mon. 221.....	3,405.1	Mon. 253.....	49 00 01.37 114 47 43.19	89 48 42 269 50 22	Mon. 253.....	2,083.8
Mon. 222.....	49 00 03.29 116 01 53.03	89 54 08 269 52 38	Mon. 222.....	2,186.0	Mon. 254.....	49 00 01.54 114 46 03.81	89 51 30 269 59 55	Mon. 254.....	4,004.2
			Mon. 223.....	2,186.0				Mon. 255.....	2,020.2
				4,409.7					672.6

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 255.....	49 00 01.54 114 45 30.71	90 00 20 269 41 06	Mon. 254..... Mon. 256.....	672.6 2,376.6	Mon. 287.....	48 59 52.58 113 29 35.26	89 49 37 269 48 10	Mon. 286..... Mon. 288.....	2,404.5 2,437.1
Mon. 256.....	49 00 01.95 114 43 33.80	89 42 34 269 42 30	Mon. 255..... Mon. 257.....	2,376.6 4,072.5	Mon. 288.....	48 59 52.84 113 27 35.37	89 49 41 269 53 33	Mon. 287..... Mon. 289.....	2,437.1 2,059.6
Mon. 257.....	49 00 02.57 114 40 13.44	89 45 01 269 43 49	Mon. 256..... Mon. 258.....	4,072.5 3,672.5	Mon. 289.....	48 59 52.95 113 25 54.05	89 54 49 269 51 51	Mon. 288..... Mon. 290.....	2,059.6 3,260.6
Mon. 258.....	49 00 03.09 114 37 12.76	89 46 06 269 47 36	Mon. 257..... Mon. 259.....	3,672.5 3,432.8	Mon. 290.....	48 59 53.17 113 23 13.64	89 53 52 269 51 48	Mon. 289..... Mon. 290-A.....	3,260.6 654.0
Mon. 259.....	49 00 03.46 114 34 23.87	89 49 43 269 48 58	Mon. 258..... Mon. 260.....	3,432.8 2,983.7	Mon. 290-A.....	48 59 53.22 113 22 41.46	89 52 12 269 52 12	Mon. 290..... Mon. 290-B.....	654.0 24.76
Mon. 260.....	49 00 03.74 114 31 57.06	89 50 49 269 50 49	Mon. 259..... Mon. 261.....	2,983.7 3,996.8	Mon. 290-B.....	48 59 53.22 113 22 40.24	89 52 13 269 52 13	Mon. 290-A..... Mon. 291.....	24.76 2,391.6
Mon. 261.....	49 00 04.04 114 28 40.44	89 53 17 270 00 28	Mon. 260..... Mon. 262.....	3,996.8 1,082.6	Mon. 291.....	48 59 53.38 113 20 42.59	89 53 42 269 52 09	Mon. 290-B..... Mon. 292.....	2,391.6 2,219.1
Mon. 262.....	49 00 04.03 114 27 47.18	90 01 08 269 57 23	Mon. 261..... Mon. 263.....	1,082.6 3,588.2	Mon. 292.....	48 59 53.53 113 18 53.42	89 53 31 269 52 06	Mon. 291..... Mon. 293.....	2,219.1 2,080.9
Mon. 263.....	49 00 04.08 114 24 50.64	89 59 37 269 59 21	Mon. 262..... Mon. 264.....	3,588.2 1,816.0	Mon. 293.....	48 59 53.67 133 17 11.04	89 53 24 269 52 39	Mon. 292..... Mon. 294.....	2,080.9 1,980.5
Mon. 264.....	49 00 04.08 114 23 21.30	90 00 28 269 59 36	Mon. 263..... Mon. 265.....	1,816.0 1,575.5	Mon. 294.....	48 59 53.79 113 15 33.61	89 53 53 269 52 41	Mon. 293..... Mon. 295.....	1,980.5 2,628.3
Mon. 265.....	49 00 04.08 114 22 03.78	90 00 35 269 58 38	Mon. 264..... Mon. 266.....	1,575.5 495.4	Mon. 295.....	48 59 53.95 113 13 24.31	89 54 19 269 52 04	Mon. 294..... Mon. 296.....	2,628.3 1,170.7
Mon. 266.....	49 00 04.09 114 21 39.41	89 58 57 270 33 04	Mon. 265..... Mon. 267.....	495.4 2,971.1	Mon. 296.....	48 59 54.04 113 12 26.72	89 52 47 269 51 02	Mon. 295..... Mon. 297.....	1,170.7 2,567.8
Mon. 267.....	49 00 03.14 114 19 13.24	90 34 54 270 35 20	Mon. 266..... Mon. 268.....	2,971.1 4,458.6	Mon. 297.....	48 59 54.24 113 10 20.39	89 52 37 269 51 17	Mon. 296..... Mon. 298.....	2,567.8 2,333.6
Mon. 268.....	49 00 01.60 114 15 33.90	90 38 06 270 37 53	Mon. 267..... Mon. 269.....	4,458.6 4,360.8	Mon. 298.....	48 59 54.41 113 08 25.59	89 52 43 269 53 00	Mon. 297..... Mon. 299.....	2,333.6 2,664.5
Mon. 269.....	48 59 59.98 114 11 59.37	90 40 35 270 42 29	Mon. 268..... Mon. 270.....	4,360.8 1,502.6	Mon. 299.....	48 59 54.57 113 06 14.50	89 54 39 269 52 52	Mon. 298..... Mon. 300.....	2,664.5 2,970.7
Mon. 270.....	48 59 59.38 114 10 45.45	90 43 25 270 41 20	Mon. 269..... Mon. 271.....	1,502.6 3,714.2	Mon. 300.....	48 59 54.74 113 03 48.36	89 54 42 269 52 40	Mon. 299..... Mon. 301.....	2,970.7 1,952.6
Mon. 271.....	48 59 57.89 114 07 42.74	90 43 38 270 43 15	Mon. 270..... Mon. 272.....	3,714.2 4,487.9	Mon. 301.....	48 59 54.86 113 02 12.29	89 53 52 269 52 12	Mon. 300..... Mon. 302.....	1,952.6 3,466.5
Mon. 272 <sup>1</sup> .....	48 59 56.00 114 04 01.96	90 46 02 270 05 36	Mon. 271..... Mon. 273.....	4,487.9 1,865.6	Mon. 302.....	48 59 55.08 112 59 21.76	89 54 21 270 10 22	Mon. 301..... Mon. 303.....	3,466.5 2,730.2
Mon. 273.....	48 59 55.89 114 02 30.18	90 06 45 270 04 50	Mon. 272..... Mon. 274.....	1,865.6 4,955.4	Mon. 303.....	48 59 54.80 112 57 07.44	90 12 03 270 10 46	Mon. 302..... Mon. 304.....	2,730.2 2,125.3
Mon. 274.....	48 59 55.60 113 58 26.40	90 07 54 270 05 03	Mon. 273..... Mon. 275.....	4,955.4 2,649.0	Mon. 304.....	48 59 54.57 112 55 22.89	90 12 05 269 56 13	Mon. 303..... Mon. 305.....	2,125.3 2,523.1
Mon. 275.....	48 59 55.45 113 56 16.07	90 06 41 270 05 08	Mon. 274..... Mon. 276.....	2,649.0 2,394.7	Mon. 305.....	48 59 54.64 112 53 18.76	89 57 47 269 56 04	Mon. 304..... Mon. 306.....	2,523.1 2,480.1
Mon. 276.....	48 59 55.32 113 54 18.27	90 06 37 270 28 36	Mon. 275..... Mon. 277.....	2,394.7 2,553.6	Mon. 306.....	48 59 54.71 112 51 16.75	89 57 38 269 56 10	Mon. 305..... Mon. 307.....	2,480.1 2,369.4
Mon. 277.....	48 59 54.61 113 52 12.64	90 30 10 270 27 39	Mon. 276..... Mon. 278.....	2,553.6 3,381.7	Mon. 307.....	48 59 54.78 112 49 20.18	89 57 38 269 55 57	Mon. 306..... Mon. 308.....	2,369.4 2,321.5
Mon. 278.....	48 59 53.70 113 49 26.28	90 29 44 270 28 47	Mon. 277..... Mon. 279.....	3,381.7 4,021.4	Mon. 308.....	48 59 54.85 112 47 25.98	89 57 23 269 55 50	Mon. 307..... Mon. 309.....	2,321.5 2,287.8
Mon. 279.....	48 59 52.64 113 46 08.45	90 29 16 270 28 56	Mon. 278..... Mon. 280.....	4,021.4 4,307.5	Mon. 309.....	48 59 54.93 112 45 33.42	89 57 15 269 53 11	Mon. 308..... Mon. 310.....	2,287.8 2,554.3
Mon. 280.....	48 59 51.41 113 42 36.55	90 31 36 270 28 24	Mon. 279..... Mon. 281.....	4,307.5 1,195.2	Mon. 310.....	48 59 55.07 112 43 27.76	89 54 46 269 53 14	Mon. 309..... Mon. 311.....	2,554.3 2,267.1
Mon. 281.....	48 59 51.08 113 41 37.75	90 29 09 269 30 04	Mon. 280..... Mon. 282.....	1,195.2 3,208.1	Mon. 311.....	48 59 55.20 112 41 36.23	89 54 38 269 55 59	Mon. 310..... Mon. 312.....	2,267.1 2,667.0
Mon. 282.....	48 59 51.96 113 38 59.94	89 32 03 269 30 30	Mon. 281..... Mon. 283.....	3,208.1 3,017.0	Mon. 312.....	48 59 55.28 112 39 25.03	89 57 38 269 55 59	Mon. 311..... Mon. 313.....	2,667.0 2,433.4
Mon. 283.....	48 59 52.77 113 36 31.52	89 32 22 269 31 13	Mon. 282..... Mon. 284.....	3,017.0 1,993.1	Mon. 313.....	48 59 55.36 112 37 25.31	89 57 29 269 56 44	Mon. 312..... Mon. 314.....	2,433.4 2,237.2
Mon. 284.....	48 59 53.30 113 34 53.47	89 32 27 270 24 59	Mon. 283..... Mon. 285.....	1,993.1 1,070.3	Mon. 314.....	48 59 55.41 112 35 35.25	89 58 07 269 56 34	Mon. 313..... Mon. 315.....	2,237.2 2,168.2
Mon. 285.....	48 59 53.04 113 34 00.82	90 25 38 270 24 12	Mon. 284..... Mon. 286.....	1,070.3 2,993.6	Mon. 315.....	48 59 55.47 112 33 48.58	89 57 55 269 58 24	Mon. 314..... Mon. 316.....	2,168.2 2,428.3
Mon. 286.....	48 59 52.33 113 31 33.55	90 26 03 269 48 08	Mon. 285..... Mon. 287.....	2,993.6 2,404.5	Mon. 316.....	48 59 55.49 112 31 49.12	89 59 54 269 58 06	Mon. 315..... Mon. 317.....	2,428.3 2,696.1

<sup>1</sup> Monument 272 marks the summit of the Rocky Mountains.

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 317.....	48 59 55.52 112 29 36.48	89 59 46 270 19 11	Mon. 316..... Mon. 318.....	2,696.1 1,605.5	Mon. 349.....	48 59 48.38 111 31 12.74	89 50 59 269 49 32	Mon. 348..... Mon. 350.....	1,841.2 2,977.5
Mon. 318.....	48 59 55.22 112 28 17.50	90 20 11 270 18 34	Mon. 317..... Mon. 319.....	1,605.5 2,420.7	Mon. 350.....	48 59 48.65 111 28 46.26	89 51 22 269 49 55	Mon. 349..... Mon. 351.....	2,977.5 2,578.4
Mon. 319.....	48 59 54.78 112 26 18.41	90 20 04 269 41 39	Mon. 318..... Mon. 320.....	2,420.7 3,372.8	Mon. 351.....	48 59 48.88 111 26 39.42	89 51 31 269 49 06	Mon. 350..... Mon. 352.....	2,578.4 2,696.6
Mon. 320.....	48 59 55.33 112 23 32.48	89 43 44 269 59 58	Mon. 319..... Mon. 321.....	3,372.8 2,886.2	Mon. 352.....	48 59 49.13 111 24 26.76	89 50 46 269 49 28	Mon. 351..... Mon. 353.....	2,696.6 1,801.9
Mon. 321.....	48 59 55.30 112 21 10.49	90 01 45 269 59 19	Mon. 320..... Mon. 322.....	2,886.2 1,425.5	Mon. 353.....	48 59 49.30 111 22 58.12	89 50 35 269 49 32	Mon. 352..... Mon. 354.....	1,801.9 2,962.0
Mon. 322.....	48 59 55.31 112 20 00.36	90 00 12 269 59 06	Mon. 321..... Mon. 323.....	1,425.5 2,612.5	Mon. 354.....	48 59 49.49 111 21 21.60	89 50 36 269 49 22	Mon. 353..... Mon. 355.....	1,962.0 2,746.9
Mon. 323.....	48 59 55.31 112 17 51.83	90 00 43 269 59 31	Mon. 322..... Mon. 324.....	2,612.5 2,205.1	Mon. 355.....	48 59 49.74 111 19 06.46	89 51 04 269 49 32	Mon. 354..... Mon. 356.....	2,746.9 2,989.0
Mon. 324.....	48 59 55.30 112 16 03.35	90 00 53 269 59 42	Mon. 323..... Mon. 325.....	2,205.1 2,173.1	Mon. 356.....	48 59 50.01 111 16 39.42	89 51 23 269 49 55	Mon. 355..... Mon. 357.....	2,989.0 2,952.1
Mon. 325.....	48 59 55.30 112 14 16.44	90 01 03 269 59 39	Mon. 324..... Mon. 326.....	2,173.1 3,010.8	Mon. 357.....	48 59 50.26 111 14 14.20	89 51 44 269 50 06	Mon. 356..... Mon. 358.....	2,952.1 2,616.8
Mon. 326.....	48 59 55.28 112 11 48.32	90 01 31 269 59 33	Mon. 325..... Mon. 327.....	3,010.8 2,781.6	Mon. 358.....	48 59 50.49 111 12 05.47	89 51 43 269 47 01	Mon. 357..... Mon. 359.....	2,616.8 1,583.7
Mon. 327.....	48 59 55.27 112 09 31.47	90 01 16 269 59 17	Mon. 326..... Mon. 328.....	2,781.6 2,210.5	Mon. 359.....	48 59 50.67 111 10 47.56	89 48 00 269 45 24	Mon. 358..... Mon. 360.....	1,583.7 2,244.5
Mon. 328.....	48 59 55.27 112 07 42.73	90 00 39 269 59 38	Mon. 327..... Mon. 329.....	2,210.5 2,080.8	Mon. 360.....	48 59 50.97 111 08 57.14	89 46 47 269 45 44	Mon. 359..... Mon. 361.....	2,244.5 3,081.5
Mon. 329.....	48 59 55.26 112 06 00.36	90 00 55 270 00 38	Mon. 328..... Mon. 330.....	2,080.8 2,698.4	Mon. 361.....	48 59 51.35 111 06 25.55	89 47 38 269 46 31	Mon. 360..... Mon. 362.....	3,081.5 1,341.3
Mon. 330.....	48 59 55.23 112 03 47.60	90 02 18 270 00 16	Mon. 329..... Mon. 331.....	2,698.4 2,962.0	Mon. 362.....	48 59 51.52 111 05 19.56	89 47 21 269 44 54	Mon. 361..... Mon. 363.....	1,341.3 3,420.7
Mon. 331.....	48 59 55.19 112 01 21.89	90 02 06 270 21 59	Mon. 330..... Mon. 332.....	2,962.0 2,068.8	Mon. 363.....	48 59 51.97 111 02 31.27	89 47 01 269 45 02	Mon. 362..... Mon. 364.....	3,420.7 2,428.0
Mon. 332.....	48 59 54.75 111 59 40.11	90 23 16 270 21 33	Mon. 331..... Mon. 333.....	2,068.8 1,894.9	Mon. 364.....	48 59 52.30 111 00 31.81	89 46 32 269 44 47	Mon. 363..... Mon. 365.....	2,428.0 2,479.2
Mon. 333.....	48 59 54.36 111 58 06.89	90 22 43 270 21 15	Mon. 332..... Mon. 334.....	1,894.9 784.7	Mon. 365.....	48 59 52.63 110 58 29.84	89 46 19 269 44 39	Mon. 364..... Mon. 366.....	2,479.2 2,134.8
Mon. 334.....	48 59 54.20 111 57 28.28	90 21 44 270 19 55	Mon. 333..... Mon. 335.....	784.7 1,016.3	Mon. 366.....	48 59 52.93 110 56 44.81	89 45 58 269 50 35	Mon. 365..... Mon. 367.....	2,134.8 1,578.4
Mon. 335.....	48 59 54.01 111 56 38.29	90 20 33 270 19 51	Mon. 334..... Mon. 336.....	1,016.3 2,210.2	Mon. 367.....	48 59 53.06 110 55 27.16	89 51 34 269 50 07	Mon. 366..... Mon. 368.....	1,578.4 3,284.5
Mon. 336.....	48 59 53.58 111 54 49.56	90 21 13 270 20 34	Mon. 335..... Mon. 337.....	2,210.2 1,457.8	Mon. 368.....	48 59 53.34 110 52 45.58	89 52 09 269 37 39	Mon. 367..... Mon. 369.....	3,284.5 1,884.8
Mon. 337.....	48 59 53.29 111 53 37.84	90 21 28 270 24 56	Mon. 336..... Mon. 338.....	1,457.8 1,870.0	Mon. 369.....	48 59 53.72 110 51 12.86	89 38 49 269 37 18	Mon. 368..... Mon. 370.....	1,884.8 2,062.8
Mon. 338.....	48 59 52.84 111 52 05.84	90 26 05 270 24 31	Mon. 337..... Mon. 339.....	1,870.0 2,678.2	Mon. 370.....	48 59 54.15 110 49 31.38	89 38 35 269 44 02	Mon. 369..... Mon. 371.....	2,062.8 3,093.4
Mon. 339.....	48 59 52.20 111 49 54.09	90 26 10 270 22 34	Mon. 338..... Mon. 340.....	2,678.2 1,849.9	Mon. 371.....	48 59 54.59 110 46 59.20	89 45 57 269 44 24	Mon. 370..... Mon. 372.....	3,093.4 2,634.8
Mon. 340.....	48 59 51.80 111 48 23.08	90 23 43 270 22 07	Mon. 339..... Mon. 341.....	1,849.9 2,778.4	Mon. 372.....	48 59 54.95 110 44 49.57	89 46 02 269 51 54	Mon. 371..... Mon. 373.....	2,634.8 2,261.9
Mon. 341.....	48 59 51.20 111 46 06.40	90 23 50 270 22 11	Mon. 340..... Mon. 342.....	2,778.4 2,178.1	Mon. 373.....	48 59 55.11 110 42 58.30	89 53 18 269 51 57	Mon. 372..... Mon. 374.....	2,261.9 2,420.6
Mon. 342.....	48 59 50.73 111 44 19.25	90 23 32 270 22 06	Mon. 341..... Mon. 343.....	2,178.1 2,722.8	Mon. 374.....	48 59 55.28 110 40 59.21	89 53 27 269 52 08	Mon. 373..... Mon. 375.....	2,420.6 2,594.1
Mon. 343.....	48 59 50.14 111 42 05.30	90 23 47 270 22 07	Mon. 342..... Mon. 344.....	2,722.8 2,392.0	Mon. 375.....	48 59 55.45 110 38 51.59	89 53 44 269 52 11	Mon. 374..... Mon. 376.....	2,594.1 2,146.2
Mon. 344.....	48 59 49.63 111 40 07.62	90 23 36 270 22 01	Mon. 343..... Mon. 345.....	2,392.0 2,428.6	Mon. 376.....	48 59 55.60 110 37 06.00	89 53 31 269 51 48	Mon. 375..... Mon. 377.....	2,146.2 2,750.0
Mon. 345.....	48 59 49.11 111 38 08.15	90 23 31 270 24 43	Mon. 344..... Mon. 346.....	2,428.6 2,402.5	Mon. 377.....	48 59 55.79 110 34 50.71	89 53 30 269 52 20	Mon. 376..... Mon. 378.....	2,750.0 1,695.1
Mon. 346.....	48 59 48.53 111 36 09.96	90 26 12 270 24 48	Mon. 345..... Mon. 347.....	2,402.5 2,042.1	Mon. 378.....	48 59 55.90 110 33 27.32	89 53 23 269 52 03	Mon. 377..... Mon. 379.....	1,695.1 3,235.6
Mon. 347.....	48 59 48.04 111 34 29.50	90 26 04 269 50 42	Mon. 346..... Mon. 348.....	2,042.1 2,158.3	Mon. 379.....	48 59 56.11 110 30 48.14	89 54 03 269 52 24	Mon. 378..... Mon. 380.....	3,235.6 1,611.1
Mon. 348.....	48 59 48.22 111 32 43.32	89 52 02 269 49 51	Mon. 347..... Mon. 349.....	2,158.3 1,841.2	Mon. 380.....	48 59 56.22 110 29 28.88	89 53 24 269 51 58	Mon. 379..... Mon. 381.....	1,611.1 3,236.5

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 381.....	48 59 56.43 110 26 49.66	89 53 58 269 52 27	Mon. 380..... Mon. 382.....	3,236.5 1,853.9	Mon. 411.....	49 00 01.30 109 27 36.53	89 53 17 269 52 07	Mon. 410..... Mon. 412.....	2,386.2 1,128.1
Mon. 382.....	48 59 56.56 110 25 18.45	89 53 36 269 51 50	Mon. 381..... Mon. 383.....	1,853.9 2,958.6	Mon. 412.....	49 00 01.38 109 26 41.03	89 52 49 269 51 55	Mon. 411..... Mon. 413.....	1,128.1 1,817.4
Mon. 383.....	48 59 56.78 110 22 52.90	89 53 40 269 51 37	Mon. 382..... Mon. 384.....	2,958.6 2,157.8	Mon. 413.....	49 00 01.51 109 25 11.62	89 53 02 270 05 19	Mon. 412..... Mon. 414.....	1,817.4 2,093.3
Mon. 384.....	48 59 56.91 110 21 09.16	89 52 55 269 51 41	Mon. 383..... Mon. 385.....	2,157.8 1,993.6	Mon. 414.....	49 00 01.40 109 23 28.63	90 06 37 270 05 20	Mon. 413..... Mon. 415.....	2,093.3 1,947.3
Mon. 385.....	48 59 57.06 110 19 31.08	89 52 55 269 51 01	Mon. 384..... Mon. 386.....	1,993.6 2,896.4	Mon. 415.....	49 00 01.29 109 21 52.83	90 06 32 270 13 10	Mon. 414..... Mon. 416.....	1,947.3 2,407.7
Mon. 386.....	48 59 57.28 110 17 08.59	89 52 49 269 51 18	Mon. 385..... Mon. 387.....	2,896.4 2,096.7	Mon. 416.....	49 00 00.97 109 19 54.37	90 14 39 270 13 07	Mon. 415..... Mon. 417.....	2,407.7 2,227.2
Mon. 387.....	48 59 57.44 110 15 25.44	89 52 36 269 51 52	Mon. 386..... Mon. 388.....	2,096.7 2,220.3	Mon. 417.....	49 00 00.68 109 18 04.80	90 14 30 270 13 14	Mon. 416..... Mon. 418.....	2,227.2 1,735.7
Mon. 388.....	48 59 57.59 110 13 36.21	89 53 14 269 51 41	Mon. 387..... Mon. 388-A.....	2,220.3 810.9	Mon. 418.....	49 00 00.46 109 16 39.40	90 14 18 270 09 49	Mon. 417..... Mon. 419.....	1,735.7 2,672.7
Mon. 388-A.....	48 59 57.65 110 12 56.31	89 52 11 269 52 11	Mon. 388..... Mon. 388-B.....	810.9 97.8	Mon. 419.....	49 00 00.19 109 14 27.92	90 11 28 270 10 26	Mon. 418..... Mon. 420.....	2,672.7 2,241.0
Mon. 388-B.....	48 59 57.66 110 12 51.50	89 52 15 269 52 15	Mon. 388-A..... Mon. 389.....	97.8 1,710.4	Mon. 420.....	48 59 59.95 109 12 37.66	90 11 49 270 10 41	Mon. 419..... Mon. 421.....	2,241.0 1,402.8
Mon. 389.....	48 59 57.78 110 11 27.35	89 53 18 269 52 52	Mon. 388-B..... Mon. 390.....	1,710.4 3,145.7	Mon. 421.....	48 59 59.81 109 11 28.65	90 11 33 270 10 37	Mon. 420..... Mon. 422.....	1,402.8 1,737.8
Mon. 390.....	48 59 57.96 110 08 52.59	89 54 49 269 52 33	Mon. 389..... Mon. 391.....	3,145.7 2,870.9	Mon. 422.....	48 59 59.62 109 10 03.15	90 11 42 270 09 58	Mon. 421..... Mon. 423.....	1,737.8 2,721.6
Mon. 391.....	48 59 58.14 110 06 31.35	89 54 20 269 52 28	Mon. 390..... Mon. 392.....	2,870.9 2,165.5	Mon. 423.....	48 59 59.35 109 07 49.26	90 11 39 270 10 03	Mon. 422..... Mon. 424.....	2,721.6 2,852.6
Mon. 392.....	48 59 58.28 110 04 44.82	89 53 48 269 52 20	Mon. 391..... Mon. 393.....	2,165.5 2,654.8	Mon. 424.....	48 59 59.05 109 05 28.92	90 11 49 270 09 21	Mon. 423..... Mon. 425.....	2,852.6 2,664.1
Mon. 393.....	48 59 58.45 110 02 34.21	89 53 59 269 54 06	Mon. 392..... Mon. 394.....	2,654.8 3,126.3	Mon. 425.....	48 59 58.80 109 03 17.85	90 11 00 270 09 43	Mon. 424..... Mon. 426.....	2,664.1 1,727.3
Mon. 394.....	48 59 58.59 110 00 00.40	89 56 02 269 54 30	Mon. 393..... Mon. 395.....	3,126.3 1,694.7	Mon. 426.....	48 59 58.63 109 01 52.87	90 10 47 270 09 50	Mon. 425..... Mon. 427.....	1,727.3 2,539.7
Mon. 395.....	48 59 58.67 109 58 37.03	89 55 33 269 50 50	Mon. 394..... Mon. 396.....	1,694.7 2,523.7	Mon. 427.....	48 59 58.38 108 59 47.92	90 11 25 270 09 45	Mon. 426..... Mon. 428.....	2,539.7 2,612.8
Mon. 396.....	48 59 58.87 109 56 32.87	89 52 24 269 50 44	Mon. 395..... Mon. 397.....	2,523.7 2,296.0	Mon. 428.....	48 59 58.12 108 57 39.38	90 11 22 270 09 12	Mon. 427..... Mon. 429.....	2,612.8 2,263.0
Mon. 397.....	48 59 59.06 109 54 39.91	89 52 09 269 52 49	Mon. 396..... Mon. 398.....	2,296.0 2,046.4	Mon. 429.....	48 59 57.91 108 55 48.04	90 10 36 270 09 18	Mon. 428..... Mon. 430.....	2,263.0 1,990.4
Mon. 398.....	48 59 59.18 109 52 59.24	89 54 05 269 52 44	Mon. 397..... Mon. 399.....	2,046.4 2,782.1	Mon. 430.....	48 59 57.72 108 54 10.12	90 10 32 270 09 27	Mon. 429..... Mon. 431.....	1,990.4 2,459.4
Mon. 399.....	48 59 59.35 109 50 42.36	89 54 28 269 53 12	Mon. 398..... Mon. 400.....	2,782.1 2,743.7	Mon. 431.....	48 59 57.48 108 52 09.13	90 10 58 270 09 39	Mon. 430..... Mon. 432.....	2,459.4 2,518.4
Mon. 400.....	48 59 59.50 109 48 27.38	89 54 54 269 53 15	Mon. 399..... Mon. 401.....	2,743.7 2,072.1	Mon. 432.....	48 59 57.24 108 50 05.23	90 11 12 269 56 42	Mon. 431..... Mon. 433.....	2,518.4 1,870.8
Mon. 401.....	48 59 59.62 109 46 45.44	89 54 32 269 53 06	Mon. 400..... Mon. 402.....	2,072.1 1,747.1	Mon. 433.....	48 59 57.29 108 48 33.19	89 57 51 269 56 57	Mon. 432..... Mon. 434.....	1,870.8 1,917.9
Mon. 402.....	48 59 59.73 109 45 19.48	89 54 11 269 52 25	Mon. 401..... Mon. 403.....	1,747.1 3,076.1	Mon. 434.....	48 59 57.33 108 46 58.84	89 58 08 269 55 12	Mon. 433..... Mon. 435.....	1,917.9 1,932.4
Mon. 403.....	48 59 59.92 109 42 48.15	89 54 20 269 51 05	Mon. 402..... Mon. 404.....	3,076.1 2,928.5	Mon. 435.....	48 59 57.41 108 45 23.77	89 56 24 269 55 23	Mon. 434..... Mon. 436.....	1,932.4 2,199.4
Mon. 404.....	49 00 00.14 109 40 24.07	89 52 54 269 50 58	Mon. 403..... Mon. 405.....	2,928.5 1,858.9	Mon. 436.....	48 59 57.49 108 43 35.56	89 56 45 269 55 17	Mon. 435..... Mon. 437.....	2,199.4 2,672.3
Mon. 405.....	49 00 00.29 109 38 52.61	89 52 07 269 50 36	Mon. 404..... Mon. 406.....	1,858.9 1,889.0	Mon. 437.....	48 59 57.59 108 41 24.09	89 56 56 269 55 05	Mon. 436..... Mon. 438.....	2,672.3 2,128.4
Mon. 406.....	49 00 00.44 109 37 19.68	89 51 46 269 51 56	Mon. 405..... Mon. 407.....	1,889.0 3,053.4	Mon. 438.....	48 59 57.67 108 39 39.38	89 56 24 269 54 55	Mon. 437..... Mon. 439.....	2,128.4 2,662.1
Mon. 407.....	49 00 00.65 109 34 49.46	89 53 49 269 50 53	Mon. 406..... Mon. 408.....	3,053.4 2,444.8	Mon. 439.....	48 59 57.78 108 37 28.41	89 56 34 269 55 57	Mon. 438..... Mon. 440.....	2,662.1 2,045.1
Mon. 408.....	49 00 00.84 109 32 49.17	89 52 24 269 50 57	Mon. 407..... Mon. 409.....	2,444.8 2,299.2	Mon. 440.....	48 59 57.85 108 35 47.80	89 57 13 269 55 52	Mon. 439..... Mon. 441.....	2,045.1 3,025.6
Mon. 409.....	49 00 01.02 109 30 56.06	89 52 23 269 52 05	Mon. 408..... Mon. 410.....	2,299.2 1,669.5	Mon. 441.....	48 59 57.94 108 33 18.95	89 57 44 269 56 08	Mon. 440..... Mon. 442.....	3,025.6 2,354.1
Mon. 410.....	49 00 01.14 109 29 33.92	89 53 07 269 51 49	Mon. 409..... Mon. 411.....	1,669.5 2,386.2	Mon. 442.....	48 59 58.01 108 31 23.14	89 57 35 269 56 09	Mon. 441..... Mon. 443.....	2,354.1 1,522.2



## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 443.....	48 59 58.06 108 30 08.25	89 57 05 269 56 05	Mon. 442..... Mon. 444.....	1,522.2 2,085.7	Mon. 475.....	48 59 57.97 107 29 39.63	90 06 23 270 05 21	Mon. 474..... Mon. 476.....	2,330.4 2,002.7
Mon. 444.....	48 59 58.12 108 28 25.64	89 57 23 270 00 03	Mon. 443..... Mon. 445.....	2,085.7 2,351.5	Mon. 476.....	48 59 57.85 107 28 01.10	90 06 35 270 05 33	Mon. 475..... Mon. 477.....	2,002.7 1,904.8
Mon. 445.....	48 59 58.10 108 26 29.95	90 01 31 270 00 37	Mon. 444..... Mon. 446.....	2,351.5 1,346.2	Mon. 477.....	48 59 57.74 107 26 27.39	90 06 44 270 05 35	Mon. 476..... Mon. 478.....	1,904.8 1,904.0
Mon. 446.....	48 59 58.09 108 25 23.72	90 01 27 269 53 57	Mon. 445..... Mon. 447.....	1,346.2 2,655.6	Mon. 478.....	48 59 57.63 107 24 53.72	90 06 46 268 47 24	Mon. 477..... Mon. 479.....	1,904.0 1,956.8
Mon. 447.....	48 59 58.22 108 23 13.07	89 55 36 269 53 51	Mon. 446..... Mon. 448.....	2,655.6 2,618.4	Mon. 479.....	48 59 58.96 107 23 17.47	88 48 37 268 47 42	Mon. 478..... Mon. 480.....	1,956.8 1,997.5
Mon. 448.....	48 59 58.35 108 21 04.26	89 55 29 269 53 49	Mon. 447..... Mon. 449.....	2,618.4 2,697.3	Mon. 480.....	49 00 00.31 107 21 39.22	88 48 56 270 01 19	Mon. 479..... Mon. 481.....	1,997.5 2,872.2
Mon. 449.....	48 59 58.49 108 18 51.55	89 55 29 269 55 59	Mon. 448..... Mon. 450.....	2,697.3 2,455.2	Mon. 481.....	49 00 00.25 107 19 17.91	90 03 06 270 01 06	Mon. 480..... Mon. 482.....	2,872.2 2,709.3
Mon. 450.....	48 59 58.56 108 16 50.76	89 57 30 269 55 45	Mon. 449..... Mon. 451.....	2,455.2 3,231.4	Mon. 482.....	49 00 00.20 107 17 04.62	90 02 47 269 59 13	Mon. 481..... Mon. 483.....	2,709.3 2,308.8
Mon. 451.....	48 59 58.66 108 14 11.79	89 57 45 269 58 13	Mon. 450..... Mon. 452.....	3,231.4 2,399.3	Mon. 483.....	49 00 00.20 107 15 11.03	90 00 39 269 58 03	Mon. 482..... Mon. 484.....	2,308.8 2,448.3
Mon. 452.....	48 59 58.69 108 12 13.75	89 59 42 269 58 10	Mon. 451..... Mon. 453.....	2,399.3 2,033.9	Mon. 484.....	49 00 00.23 107 13 10.58	89 59 34 270 00 24	Mon. 483..... Mon. 485.....	2,448.3 3,272.6
Mon. 453.....	48 59 58.71 108 10 33.69	89 59 26 269 58 03	Mon. 452..... Mon. 454.....	2,033.9 2,512.9	Mon. 485.....	49 00 00.18 107 10 29.57	90 02 26 270 00 43	Mon. 484..... Mon. 486.....	3,272.6 2,217.2
Mon. 454.....	48 59 58.74 108 08 30.06	89 59 36 269 57 41	Mon. 453..... Mon. 455.....	2,512.9 2,341.6	Mon. 486.....	49 00 00.15 107 08 40.49	90 02 05 270 01 11	Mon. 485..... Mon. 487.....	2,217.2 2,282.7
Mon. 455.....	48 59 58.77 108 06 34.86	89 59 08 269 57 07	Mon. 454..... Mon. 456.....	2,341.6 2,438.8	Mon. 487.....	49 00 00.11 107 06 48.19	90 02 36 270 00 27	Mon. 486..... Mon. 488.....	2,282.7 3,492.7
Mon. 456.....	48 59 58.82 108 04 34.87	89 58 38 269 56 59	Mon. 455..... Mon. 457.....	2,438.8 2,362.2	Mon. 488.....	49 00 00.06 107 03 56.35	90 02 37 270 00 15	Mon. 487..... Mon. 489.....	3,492.7 2,849.6
Mon. 457.....	48 59 58.87 108 02 38.66	89 58 27 269 56 59	Mon. 456..... Mon. 458.....	2,362.2 2,460.1	Mon. 489.....	49 00 00.03 107 01 36.16	90 02 01 270 00 06	Mon. 488..... Mon. 490.....	2,849.6 3,043.0
Mon. 458.....	48 59 58.92 108 00 37.63	89 58 30 269 56 56	Mon. 457..... Mon. 459.....	2,460.1 2,371.5	Mon. 490.....	49 00 00.00 106 59 06.45	90 01 59 270 00 30	Mon. 489..... Mon. 491.....	3,043.0 2,404.8
Mon. 459.....	48 59 58.98 107 58 40.96	89 58 24 269 57 23	Mon. 458..... Mon. 460.....	2,371.5 2,165.3	Mon. 491.....	48 59 59.97 106 57 08.14	90 01 59 270 00 13	Mon. 490..... Mon. 492.....	2,404.8 2,735.3
Mon. 460.....	48 59 59.02 107 56 54.43	89 58 43 269 57 15	Mon. 459..... Mon. 461.....	2,165.3 2,664.8	Mon. 492.....	48 59 59.95 106 54 53.57	90 01 54 270 01 22	Mon. 491..... Mon. 493.....	2,735.3 2,274.7
Mon. 461.....	48 59 59.06 107 54 43.32	89 58 54 269 57 51	Mon. 460..... Mon. 462.....	2,664.8 1,944.9	Mon. 493.....	48 59 59.90 106 53 01.66	90 02 46 270 01 47	Mon. 492..... Mon. 494.....	2,274.7 2,082.0
Mon. 462.....	48 59 59.09 107 53 07.64	89 59 03 269 57 28	Mon. 461..... Mon. 463.....	1,944.9 2,889.9	Mon. 494.....	48 59 59.86 106 51 19.23	90 03 04 269 59 46	Mon. 493..... Mon. 495.....	2,082.0 2,658.0
Mon. 463.....	48 59 59.14 107 50 45.46	89 59 15 269 57 36	Mon. 462..... Mon. 464.....	2,889.9 1,941.2	Mon. 495.....	48 59 59.84 106 49 08.46	90 01 25 269 59 45	Mon. 494..... Mon. 496.....	2,658.0 1,856.6
Mon. 464.....	48 59 59.17 107 49 09.96	89 58 48 269 57 42	Mon. 463..... Mon. 465.....	1,941.2 2,888.2	Mon. 496.....	48 59 59.84 106 47 37.12	90 00 54 270 05 13	Mon. 495..... Mon. 497.....	1,856.6 2,609.6
Mon. 465.....	48 59 59.21 107 46 47.87	89 59 29 270 06 01	Mon. 464..... Mon. 466.....	2,888.2 1,511.8	Mon. 497.....	48 59 59.69 106 45 28.74	90 06 50 270 05 35	Mon. 496..... Mon. 498.....	2,609.6 2,092.9
Mon. 466.....	48 59 59.12 107 45 33.49	90 06 57 270 05 41	Mon. 465..... Mon. 467.....	1,511.8 2,020.7	Mon. 498.....	48 59 59.56 106 43 45.77	90 06 53 270 05 20	Mon. 497..... Mon. 499.....	2,092.9 1,920.1
Mon. 467.....	48 59 59.00 107 43 54.08	90 06 56 270 07 04	Mon. 466..... Mon. 468.....	2,020.7 1,095.4	Mon. 499.....	48 59 59.46 106 42 11.30	90 06 31 270 00 24	Mon. 498..... Mon. 500.....	1,920.1 2,323.5
Mon. 468.....	48 59 58.92 107 43 00.19	90 07 45 270 07 02	Mon. 467..... Mon. 469.....	1,095.4 2,089.7	Mon. 500.....	48 59 59.43 106 40 16.99	90 01 50 269 59 41	Mon. 499..... Mon. 501.....	2,323.5 1,870.2
Mon. 469.....	48 59 58.77 107 41 17.38	90 08 19 270 05 58	Mon. 468..... Mon. 470.....	2,089.7 2,261.8	Mon. 501.....	48 59 59.43 106 38 44.98	90 00 50 269 59 19	Mon. 500..... Mon. 502.....	1,870.2 2,728.3
Mon. 470.....	48 59 58.63 107 39 26.10	90 07 22 270 04 56	Mon. 469..... Mon. 471.....	2,261.8 2,257.8	Mon. 502.....	48 59 59.42 106 36 30.76	90 01 01 270 11 13	Mon. 501..... Mon. 503.....	2,728.3 2,569.4
Mon. 471.....	48 59 58.51 107 37 35.02	90 06 20 270 05 56	Mon. 470..... Mon. 472.....	2,257.8 2,248.7	Mon. 503.....	48 59 59.13 106 34 24.35	90 12 48 270 11 39	Mon. 502..... Mon. 504.....	2,569.4 2,291.9
Mon. 472.....	48 59 58.37 107 35 44.39	90 07 19 270 04 51	Mon. 471..... Mon. 473.....	2,248.7 2,828.7	Mon. 504.....	48 59 58.87 106 32 31.80	90 13 04 270 12 36	Mon. 503..... Mon. 505.....	2,291.9 1,797.0
Mon. 473.....	48 59 58.22 107 33 25.23	90 06 36 270 05 11	Mon. 472..... Mon. 474.....	2,828.7 2,255.3	Mon. 505.....	48 59 58.64 106 31 03.19	90 13 43 270 02 52	Mon. 504..... Mon. 506.....	1,797.0 2,508.4
Mon. 474.....	48 59 58.09 107 31 34.28	90 06 35 270 04 56	Mon. 473..... Mon. 475.....	2,255.3 2,330.4	Mon. 506.....	48 59 58.56 106 28 59.79	90 04 25 270 03 10	Mon. 505..... Mon. 507.....	2,508.4 2,857.1

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 507.....	48 59 58.45 106 26 39.22	90 04 56 270 03 00	Mon. 506.....	2,857.1 2,645.6	Mon. 539.....	48 59 58.18 105 24 07.06	90 05 53 270 04 33	Mon. 538..... Mon. 540.....	2,284.8 2,551.5
Mon. 508.....	48 59 58.35 106 24 29.07	90 04 38 270 05 18	Mon. 507..... Mon. 509.....	2,645.6 3,378.3	Mon. 540.....	48 59 58.05 105 22 01.54	90 06 06 270 04 48	Mon. 539..... Mon. 541.....	2,551.5 2,575.3
Mon. 509.....	48 59 58.15 106 21 42.86	90 07 24 270 04 18	Mon. 508..... Mon. 510.....	3,378.3 2,830.2	Mon. 541.....	48 59 57.91 105 19 54.84	90 06 24 270 04 06	Mon. 540..... Mon. 542.....	2,575.3 2,535.4
Mon. 510.....	48 59 58.02 106 19 23.63	90 06 03 270 06 22	Mon. 509..... Mon. 511.....	2,830.2 1,810.7	Mon. 542.....	48 59 57.80 105 17 50.11	90 05 42 270 05 07	Mon. 541..... Mon. 543.....	2,535.4 2,406.9
Mon. 511.....	48 59 57.90 106 17 54.55	90 07 29 270 04 50	Mon. 510..... Mon. 512.....	1,810.7 1,900.3	Mon. 543.....	48 59 57.66 105 15 51.74	90 06 37 270 04 49	Mon. 542..... Mon. 544.....	2,406.9 2,475.3
Mon. 512.....	48 59 57.80 106 16 21.06	90 06 01 270 04 51	Mon. 511..... Mon. 513.....	1,900.3 3,196.1	Mon. 544.....	48 59 57.53 105 13 49.97	90 06 21 270 04 06	Mon. 543..... Mon. 545.....	2,475.3 497.7
Mon. 513.....	48 59 57.62 106 13 43.82	90 06 49 269 54 39	Mon. 512..... Mon. 514.....	3,196.1 1,966.9	Mon. 545.....	48 59 57.51 105 13 25.48	90 04 28 270 03 44	Mon. 544..... Mon. 546.....	497.7 2,934.8
Mon. 514.....	48 59 57.71 106 12 07.05	89 55 52 269 55 04	Mon. 513..... Mon. 515.....	1,966.9 1,958.0	Mon. 546.....	48 59 57.38 105 11 01.10	90 05 33 270 03 42	Mon. 545..... Mon. 547.....	2,934.8 2,694.4
Mon. 515.....	48 59 57.79 106 10 30.72	89 56 17 269 54 02	Mon. 514..... Mon. 516.....	1,958.0 2,551.6	Mon. 547.....	48 59 57.27 105 08 48.54	90 05 22 270 01 22	Mon. 546..... Mon. 548.....	2,694.4 2,037.9
Mon. 516.....	48 59 57.92 106 08 25.19	89 55 37 269 54 11	Mon. 515..... Mon. 517.....	2,551.6 2,562.0	Mon. 548.....	48 59 57.23 105 07 08.28	90 02 38 270 01 33	Mon. 547..... Mon. 549.....	2,037.9 2,902.4
Mon. 517.....	48 59 58.04 106 06 17.68	89 55 47 269 54 04	Mon. 516..... Mon. 518.....	2,562.0 2,345.8	Mon. 549.....	48 59 57.16 105 04 45.49	90 03 21 270 02 06	Mon. 548..... Mon. 550.....	2,902.4 2,086.7
Mon. 518.....	48 59 58.13 106 04 22.27	89 56 31 269 54 57	Mon. 517..... Mon. 519.....	2,345.8 2,188.7	Mon. 550.....	48 59 57.11 105 03 02.83	90 03 23 270 01 04	Mon. 549..... Mon. 551.....	2,086.7 2,332.4
Mon. 519.....	48 59 58.22 106 02 34.59	89 56 18 269 54 41	Mon. 518..... Mon. 520.....	2,188.7 2,352.8	Mon. 551.....	48 59 57.07 105 01 06.08	90 02 31 270 01 20	Mon. 550..... Mon. 552.....	2,332.4 1,755.8
Mon. 520.....	48 59 58.32 106 00 38.84	89 56 08 269 54 07	Mon. 519..... Mon. 521.....	2,352.8 2,486.4	Mon. 552.....	48 59 57.04 104 59 41.70	90 02 25 270 02 53	Mon. 551..... Mon. 553.....	1,755.8 2,733.6
Mon. 521.....	48 59 58.44 105 58 36.56	89 55 39 269 54 55	Mon. 520..... Mon. 522.....	2,486.4 2,354.4	Mon. 553.....	48 59 56.94 104 57 27.22	90 04 34 270 02 57	Mon. 552..... Mon. 554.....	2,733.6 3,144.7
Mon. 522.....	48 59 58.54 105 56 40.73	89 56 23 269 54 51	Mon. 521..... Mon. 523.....	2,354.4 2,478.2	Mon. 554.....	48 59 56.83 104 54 52.51	90 04 54 270 02 36	Mon. 553..... Mon. 555.....	3,144.7 2,920.9
Mon. 523.....	48 59 58.64 105 54 38.81	89 56 23 269 54 26	Mon. 522..... Mon. 524.....	2,478.2 2,472.8	Mon. 555.....	48 59 56.73 104 52 28.81	90 04 25 270 02 07	Mon. 554..... Mon. 556.....	2,920.9 2,699.6
Mon. 524.....	48 59 58.76 105 52 37.16	89 55 58 269 54 43	Mon. 523..... Mon. 525.....	2,472.8 2,387.8	Mon. 556.....	48 59 56.66 104 50 16.00	90 03 47 270 01 56	Mon. 555..... Mon. 557.....	2,699.6 2,427.0
Mon. 525.....	48 59 58.86 105 50 39.68	89 56 11 269 55 05	Mon. 524..... Mon. 526.....	2,387.8 2,220.0	Mon. 557.....	48 59 56.60 104 48 16.60	90 03 26 270 02 32	Mon. 556..... Mon. 558.....	2,427.0 3,011.3
Mon. 526.....	48 59 58.94 105 48 50.46	89 56 27 269 54 42	Mon. 525..... Mon. 527.....	2,220.0 2,591.9	Mon. 558.....	48 59 56.50 104 45 48.45	90 04 24 270 03 10	Mon. 557..... Mon. 559.....	3,011.3 1,125.3
Mon. 527.....	48 59 59.06 105 46 42.95	89 56 18 269 54 01	Mon. 526..... Mon. 528.....	2,591.9 2,402.4	Mon. 559.....	48 59 56.46 104 44 53.09	90 03 52 270 02 17	Mon. 558..... Mon. 560.....	1,125.3 1,921.6
Mon. 528.....	48 59 59.17 105 44 44.76	89 55 30 269 54 43	Mon. 527..... Mon. 529.....	2,402.4 2,433.8	Mon. 560.....	48 59 56.41 104 43 18.55	90 03 29 270 01 59	Mon. 559..... Mon. 561.....	1,921.6 2,730.2
Mon. 529.....	48 59 59.28 105 42 45.02	89 56 14 270 03 50	Mon. 528..... Mon. 530.....	2,433.8 2,218.7	Mon. 561.....	48 59 56.33 104 41 04.24	90 03 41 269 50 46	Mon. 560..... Mon. 562.....	2,730.2 2,356.4
Mon. 530.....	48 59 59.18 105 40 55.87	90 05 12 270 04 29	Mon. 529..... Mon. 531.....	2,218.7 2,558.1	Mon. 562.....	48 59 56.52 104 39 08.31	89 52 14 269 50 17	Mon. 561..... Mon. 563.....	2,356.4 1,694.0
Mon. 531.....	48 59 59.06 105 38 50.02	90 06 04 270 04 33	Mon. 530..... Mon. 532.....	2,558.1 2,820.6	Mon. 563.....	48 59 56.67 104 37 44.97	89 51 20 269 50 37	Mon. 562..... Mon. 564.....	1,694.0 2,341.2
Mon. 532.....	48 59 58.91 105 36 31.25	90 06 18 270 06 07	Mon. 531..... Mon. 533.....	2,820.6 1,775.6	Mon. 564.....	48 59 56.86 104 35 49.79	89 52 04 269 50 22	Mon. 563..... Mon. 565.....	2,341.2 2,251.2
Mon. 533.....	48 59 58.80 105 35 03.90	90 07 13 270 04 26	Mon. 532..... Mon. 534.....	1,775.6 1,767.8	Mon. 565.....	48 59 57.05 104 33 59.04	89 51 45 269 51 06	Mon. 564..... Mon. 566.....	2,251.2 1,668.4
Mon. 534.....	48 59 58.72 105 33 36.92	90 05 31 270 03 54	Mon. 533..... Mon. 535.....	1,767.8 3,104.1	Mon. 566.....	48 59 57.18 104 32 36.96	89 52 08 269 50 16	Mon. 565..... Mon. 567.....	1,668.4 3,082.7
Mon. 535.....	48 59 58.58 105 31 04.21	90 05 49 270 04 28	Mon. 534..... Mon. 536.....	3,104.1 2,226.0	Mon. 567.....	48 59 57.44 104 30 05.30	89 52 09 269 51 22	Mon. 566..... Mon. 568.....	3,082.7 1,648.3
Mon. 536.....	48 59 58.47 105 29 14.69	90 05 51 270 04 21	Mon. 535..... Mon. 537.....	2,226.0 1,830.1	Mon. 568.....	48 59 57.56 104 28 44.71	89 52 23 269 50 30	Mon. 567..... Mon. 569.....	1,648.3 1,830.9
Mon. 537.....	48 59 58.38 106 27 44.66	90 05 29 270 04 04	Mon. 536..... Mon. 538.....	1,830.1 2,138.1	Mon. 569.....	48 59 57.72 104 27 14.13	89 51 38 269 50 53	Mon. 568..... Mon. 570.....	1,830.9 2,048.7
Mon. 538.....	48 59 58.29 106 25 59.47	90 05 23 270 04 28	Mon. 537..... Mon. 539.....	2,138.1 2,284.8	Mon. 570.....	48 59 57.88 104 25 33.34	89 52 09 269 50 02	Mon. 569..... Mon. 571.....	2,048.7 2,318.9

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 571.....	48 59 58.08	89 51 28	Mon. 570.....	2,318.9	Mon. 603.....	48 59 57.48	89 58 46	Mon. 602.....	2,748.8
	104 23 39.25	269 50 21	Mon. 572.....	2,106.0		103 24 54.56	269 57 22	Mon. 604.....	2,542.5
Mon. 572.....	48 59 58.26	89 51 39	Mon. 571.....	2,106.0	Mon. 604.....	48 59 57.52	89 58 56	Mon. 603.....	2,542.5
	104 21 55.64	269 50 14	Mon. 573.....	2,489.6		103 22 49.48	269 57 21	Mon. 606.....	2,219.6
Mon. 573.....	48 59 58.47	89 51 47	Mon. 572.....	2,489.6	Mon. 605.....	48 59 57.56	85 58 43	Mon. 604.....	2,219.6
	104 19 53.16	269 50 13	Mon. 574.....	2,889.7		103 21 00.28	269 57 32	Mon. 606.....	2,631.9
Mon. 574.....	48 59 58.71	89 52 00	Mon. 573.....	2,889.7	Mon. 606.....	48 59 57.60	89 59 10	Mon. 605.....	2,631.9
	104 17 31.00	269 50 49	Mon. 575.....	1,534.2		103 18 50.80	269 57 16	Mon. 607.....	2,244.8
Mon. 575.....	48 59 58.84	89 51 46	Mon. 574.....	1,534.2	Mon. 607.....	48 59 57.64	89 58 39	Mon. 606.....	2,244.8
	104 16 15.52	269 50 29	Mon. 576.....	1,833.7		103 17 00.36	269 57 32	Mon. 608.....	1,739.5
Mon. 576.....	48 59 58.99	89 51 37	Mon. 575.....	1,833.7	Mon. 608.....	48 59 57.68	89 58 45	Mon. 607.....	1,739.5
	104 14 45.20	269 50 03	Mon. 577.....	1,703.1		103 15 34.79	269 56 44	Mon. 609.....	2,241.2
Mon. 577.....	48 59 59.14	89 51 06	Mon. 576.....	1,703.1	Mon. 609.....	48 59 57.73	89 58 07	Mon. 608.....	2,241.2
	104 13 21.52	269 50 37	Mon. 578.....	2,054.9		103 13 44.53	269 57 03	Mon. 610.....	1,924.8
Mon. 578.....	48 59 59.31	89 51 53	Mon. 577.....	2,054.9	Mon. 610.....	48 59 57.77	89 58 15	Mon. 609.....	1,924.8
	104 11 40.42	269 50 27	Mon. 579.....	1,780.8		103 12 09.83	270 03 15	Mon. 611.....	2,836.7
Mon. 579.....	48 59 59.46	89 51 33	Mon. 578.....	1,780.8	Mon. 611.....	48 59 57.66	90 05 00	Mon. 610.....	2,836.7
	104 10 12.81	269 49 27	Mon. 580.....	2,442.8		103 09 50.28	270 03 17	Mon. 612.....	2,461.4
Mon. 580.....	48 59 59.69	89 50 57	Mon. 579.....	2,442.8	Mon. 612.....	48 59 57.57	90 04 48	Mon. 611.....	2,461.4
	104 08 12.63	269 49 43	Mon. 581.....	1,886.4		103 07 49.18	269 59 32	Mon. 613.....	2,656.4
Mon. 581.....	48 59 59.86	89 50 53	Mon. 580.....	1,886.4	Mon. 613.....	48 59 57.56	90 01 11	Mon. 612.....	2,656.4
	104 06 39.82	270 06 41	Mon. 582.....	2,962.7		103 05 38.50	269 59 27	Mon. 614.....	3,066.8
Mon. 582.....	48 59 59.65	90 08 31	Mon. 581.....	2,962.7	Mon. 614.....	48 59 57.55	90 01 21	Mon. 613.....	3,066.8
	104 04 14.07	270 07 27	Mon. 583.....	1,637.8		103 03 07.62	270 01 01	Mon. 615.....	2,656.5
Mon. 583 <sup>a</sup> .....	48 59 59.53	90 08 27	Mon. 582.....	1,637.8	Mon. 615.....	48 59 57.50	90 02 40	Mon. 614.....	2,656.5
	104 02 53.49	270 07 19	Mon. 584.....	2,286.3		103 00 56.93	270 00 48	Mon. 616.....	2,569.5
Mon. 584.....	48 59 59.36	90 08 44	Mon. 583.....	2,286.3	Mon. 616.....	48 59 57.46	90 02 24	Mon. 615.....	2,569.5
	104 01 01.01	270 07 51	Mon. 585.....	1,258.9		102 58 50.52	270 01 48	Mon. 617.....	2,507.2
Mon. 585.....	48 59 59.26	90 08 38	Mon. 584.....	1,258.9	Mon. 617.....	48 59 57.40	90 03 21	Mon. 616.....	2,507.2
	103 59 59.08	270 07 28	Mon. 586.....	1,963.1		102 56 47.17	270 01 23	Mon. 618.....	2,700.5
Mon. 586.....	48 59 59.11	90 08 41	Mon. 585.....	1,963.1	Mon. 618.....	48 59 57.34	90 03 04	Mon. 617.....	2,700.5
	103 58 22.50	270 06 34	Mon. 587.....	2,948.8		102 54 34.31	270 00 36	Mon. 619.....	1,948.6
Mon. 587.....	48 59 58.90	90 08 24	Mon. 586.....	2,948.8	Mon. 619.....	48 59 57.32	90 01 48	Mon. 618.....	1,948.6
	103 55 57.43	270 06 19	Mon. 588.....	2,909.8		102 52 58.45	270 00 21	Mon. 620.....	2,394.7
Mon. 588.....	48 59 58.70	90 08 07	Mon. 587.....	2,909.8	Mon. 620.....	48 59 57.30	90 01 50	Mon. 619.....	2,394.7
	103 53 34.28	270 06 15	Mon. 589.....	3,089.0		102 51 00.64	270 02 57	Mon. 621.....	1,627.6
Mon. 589.....	48 59 58.49	90 08 09	Mon. 588.....	3,089.0	Mon. 621.....	48 59 57.24	90 03 57	Mon. 620.....	1,627.6
	103 51 02.31	270 06 14	Mon. 590.....	2,748.1		102 49 40.56	270 06 41	Mon. 622.....	2,139.9
Mon. 590.....	48 59 58.31	90 07 56	Mon. 589.....	2,748.1	Mon. 622.....	48 59 57.10	90 08 00	Mon. 621.....	2,139.9
	103 48 47.11	270 06 18	Mon. 591.....	2,990.0		102 47 55.29	270 06 52	Mon. 623.....	1,409.9
Mon. 591.....	48 59 58.11	90 08 09	Mon. 590.....	2,990.0	Mon. 623.....	48 59 57.00	90 07 44	Mon. 622.....	1,409.9
	103 46 20.01	270 06 38	Mon. 592.....	2,762.2		102 46 45.92	270 03 25	Mon. 624.....	2,318.9
Mon. 592.....	48 59 57.91	90 08 21	Mon. 591.....	2,762.2	Mon. 624.....	48 59 56.91	90 04 51	Mon. 623.....	2,318.9
	103 44 04.12	270 06 47	Mon. 593.....	1,650.8		102 44 51.84	270 03 16	Mon. 625.....	2,510.8
Mon. 593.....	48 59 57.80	90 07 48	Mon. 592.....	1,650.8	Mon. 625.....	48 59 56.81	90 04 49	Mon. 624.....	2,510.8
	103 42 42.91	270 07 16	Mon. 594.....	2,052.0		102 42 48.32	270 06 23	Mon. 626.....	1,995.2
Mon. 594.....	48 59 57.65	90 08 32	Mon. 593.....	2,052.0	Mon. 626.....	48 59 56.68	90 07 37	Mon. 625.....	1,995.2
	103 41 01.96	270 07 01	Mon. 595.....	2,102.5		102 41 10.16	270 06 30	Mon. 627.....	2,055.3
Mon. 595.....	48 59 57.49	90 08 19	Mon. 594.....	2,102.5	Mon. 627.....	48 59 56.55	90 07 46	Mon. 626.....	2,055.3
	103 39 18.52	270 06 41	Mon. 596.....	2,014.6		102 39 29.05	270 05 25	Mon. 628.....	1,984.2
Mon. 596.....	48 59 57.36	90 07 56	Mon. 595.....	2,014.6	Mon. 628.....	48 59 56.43	90 06 39	Mon. 627.....	1,984.2
	103 37 39.40	270 07 07	Mon. 597.....	2,107.3		102 37 51.43	270 05 15	Mon. 629.....	2,687.2
Mon. 597.....	48 59 57.20	90 08 25	Mon. 596.....	2,107.3	Mon. 629.....	48 59 56.28	90 06 55	Mon. 628.....	2,687.2
	103 35 55.73	269 56 50	Mon. 598.....	2,343.7		102 35 39.23	270 05 33	Mon. 630.....	3,237.4
Mon. 598.....	48 59 57.26	89 58 17	Mon. 597.....	2,343.7	Mon. 630.....	48 59 56.08	90 07 34	Mon. 629.....	3,237.4
	103 34 00.43	269 57 19	Mon. 599.....	1,924.8		102 32 59.96	270 06 19	Mon. 631.....	1,961.9
Mon. 599.....	48 59 57.29	89 58 31	Mon. 598.....	1,924.8	Mon. 631.....	48 59 55.95	90 07 32	Mon. 630.....	1,961.9
	103 32 25.74	269 57 16	Mon. 600.....	1,833.6		102 31 23.44	270 06 16	Mon. 632.....	2,632.3
Mon. 600.....	48 59 57.33	89 58 24	Mon. 599.....	1,833.6	Mon. 632.....	48 59 55.77	90 07 54	Mon. 631.....	2,632.3
	103 30 55.53	269 57 19	Mon. 601.....	1,719.6		102 29 13.94	270 06 34	Mon. 633.....	2,275.9
Mon. 601.....	48 59 57.36	89 58 23	Mon. 600.....	1,719.6	Mon. 633.....	48 59 55.62	90 07 59	Mon. 632.....	2,275.9
	103 29 30.93	269 57 01	Mon. 602.....	2,868.8		102 27 21.98	269 58 31	Mon. 634.....	3,066.2
Mon. 602.....	48 59 57.42	89 58 47	Mon. 601.....	2,868.8	Mon. 634.....	48 59 55.63	90 00 25	Mon. 633.....	3,066.2
	103 27 09.79	269 57 04	Mon. 603.....	2,748.8		102 24 51.13	269 58 38	Mon. 635.....	2,716.2

<sup>a</sup> Monument 583 marks the northeast corner of Montana and the northwest corner of North Dakota.

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
Mon. 635.....	48 59 55.65 102 22 37.51	90 00 19 269 58 34	Mon. 634..... Mon. 636.....	2,716.2 2,178.2	Mon. 667.....	48 59 58.02 101 27 22.52	90 00 05 269 59 11	Mon. 666..... Mon. 668.....	1,859.4 1,614.0
Mon. 636.....	48 59 55.66 102 20 50.35	89 59 55 269 58 20	Mon. 635..... Mon. 637.....	2,178.2 2,413.3	Mon. 668.....	48 59 58.02 101 26 03.12	90 00 11 269 58 58	Mon. 667..... Mon. 669.....	1,614.0 2,652.2
Mon. 637.....	48 59 55.68 102 18 41.62	89 59 49 269 58 34	Mon. 636..... Mon. 638.....	2,413.3 2,487.0	Mon. 669.....	48 59 58.02 101 23 52.64	90 00 36 269 59 11	Mon. 668..... Mon. 670.....	2,652.2 2,191.7
Mon. 638.....	48 59 55.70 102 16 49.27	90 00 06 269 58 01	Mon. 637..... Mon. 639.....	2,487.0 2,596.7	Mon. 670.....	48 59 58.03 101 22 04.81	90 00 32 269 58 36	Mon. 669..... Mon. 671.....	2,191.7 2,430.0
Mon. 639.....	48 59 55.73 102 14 41.62	89 59 37 269 58 39	Mon. 638..... Mon. 640.....	2,596.7 2,917.2	Mon. 671.....	48 59 58.04 101 20 05.26	90 00 06 269 58 49	Mon. 670..... Mon. 672.....	2,430.0 2,407.4
Mon. 640.....	48 59 55.74 102 13 07.20	89 59 50 269 58 51	Mon. 639..... Mon. 641.....	1,917.2 785.5	Mon. 672.....	48 59 58.05 101 18 06.82	90 00 19 269 58 30	Mon. 671..... Mon. 673.....	2,407.4 2,442.4
Mon. 641.....	48 59 55.75 102 12 28.65	89 59 20 269 58 38	Mon. 640..... Mon. 642.....	785.5 2,024.2	Mon. 673.....	48 59 58.07 101 16 06.66	90 00 01 269 58 19	Mon. 672..... Mon. 674.....	2,442.4 2,393.0
Mon. 642.....	48 59 55.76 102 10 48.97	89 59 53 269 58 24	Mon. 641..... Mon. 643.....	2,024.2 2,473.5	Mon. 674.....	48 59 58.09 101 14 08.93	89 59 48 269 57 41	Mon. 673..... Mon. 675.....	2,393.0 2,199.3
Mon. 643.....	48 59 55.78 102 08 47.29	89 59 56 269 58 19	Mon. 642..... Mon. 644.....	2,473.5 2,471.7	Mon. 675.....	48 59 58.12 101 12 20.73	89 59 03 269 57 31	Mon. 674..... Mon. 676.....	2,199.3 2,646.0
Mon. 644.....	48 59 55.80 102 06 45.68	89 59 50 269 58 20	Mon. 643..... Mon. 645.....	2,471.7 2,710.3	Mon. 676.....	48 59 58.17 101 10 10.56	89 59 09 269 57 46	Mon. 675..... Mon. 677.....	2,646.0 2,203.1
Mon. 645.....	48 59 55.82 102 04 32.35	90 00 00 269 58 19	Mon. 644..... Mon. 646.....	2,710.3 2,135.0	Mon. 677.....	48 59 58.20 101 08 22.17	89 59 07 269 57 35	Mon. 676..... Mon. 678.....	2,203.1 2,626.0
Mon. 646.....	48 59 55.85 102 02 47.31	89 59 38 269 58 05	Mon. 645..... Mon. 647.....	2,135.0 2,523.9	Mon. 678.....	48 59 58.24 101 06 12.48	89 59 13 269 57 27	Mon. 677..... Mon. 679.....	2,636.0 2,540.9
Mon. 647.....	48 59 55.87 102 00 43.15	89 59 39 269 58 13	Mon. 646..... Mon. 648.....	2,523.9 2,314.2	Mon. 679.....	48 59 58.28 101 04 07.48	89 59 01 269 57 41	Mon. 678..... Mon. 680.....	2,540.9 2,296.9
Mon. 648.....	48 59 55.89 101 58 49.30	89 59 39 269 48 53	Mon. 647..... Mon. 649.....	2,314.2 1,767.7	Mon. 680.....	48 59 58.31 101 02 14.47	89 59 07 269 57 35	Mon. 679..... Mon. 681.....	2,296.9 2,385.1
Mon. 649.....	48 59 56.07 101 57 22.33	89 49 59 269 49 44	Mon. 648..... Mon. 650.....	1,767.7 1,844.6	Mon. 681.....	48 59 58.35 101 00 17.13	99 59 04 269 57 30	Mon. 680..... Mon. 682.....	2,385.1 2,432.9
Mon. 650.....	48 59 56.24 101 55 51.58	89 50 52 269 50 06	Mon. 649..... Mon. 651.....	1,844.6 2,399.7	Mon. 682.....	48 59 58.39 100 58 17.44	89 59 00 269 59 33	Mon. 681..... Mon. 683.....	2,432.9 2,638.6
Mon. 651.....	48 59 56.45 101 53 53.53	89 51 35 269 55 37	Mon. 650..... Mon. 652.....	2,399.7 3,069.7	Mon. 683.....	48 59 58.38 100 56 07.63	90 01 11 269 59 36	Mon. 682..... Mon. 684.....	2,638.6 1,733.6
Mon. 652.....	48 59 56.55 101 51 22.51	89 57 31 269 56 11	Mon. 651..... Mon. 653.....	3,069.7 1,507.9	Mon. 684.....	48 59 58.38 100 54 42.34	90 00 40 270 02 26	Mon. 683..... Mon. 685.....	1,733.6 2,107.4
Mon. 653.....	48 59 56.60 101 50 08.32	89 57 07 269 54 10	Mon. 652..... Mon. 654.....	1,507.9 1,869.9	Mon. 685.....	48 59 58.32 100 52 58.66	90 03 44 270 02 44	Mon. 684..... Mon. 686.....	2,107.4 2,137.6
Mon. 654.....	48 59 56.69 101 48 36.33	89 55 20 269 54 14	Mon. 653..... Mon. 655.....	1,869.9 1,919.7	Mon. 686.....	48 59 58.25 100 51 13.50	90 04 04 270 01 21	Mon. 685..... Mon. 687.....	2,137.6 2,697.4
Mon. 655.....	48 59 56.78 101 47 01.99	89 55 26 269 53 44	Mon. 654..... Mon. 656.....	1,919.7 2,195.4	Mon. 687.....	48 59 58.20 100 49 00.80	90 03 01 270 01 16	Mon. 686..... Mon. 688.....	2,697.4 2,716.6
Mon. 656.....	48 59 56.90 101 45 13.88	89 55 06 269 53 43	Mon. 655..... Mon. 657.....	2,195.4 2,092.1	Mon. 688.....	48 59 58.14 100 46 47.15	90 02 57 270 01 34	Mon. 687..... Mon. 689.....	2,716.6 1,952.8
Mon. 657.....	48 59 57.01 101 43 30.96	89 55 01 269 53 55	Mon. 656..... Mon. 658.....	2,092.1 1,995.3	Mon. 689.....	48 59 58.10 100 45 11.08	90 02 47 270 01 42	Mon. 688..... Mon. 690.....	1,952.8 1,956.4
Mon. 658.....	48 59 57.11 101 41 52.80	89 55 09 269 53 42	Mon. 657..... Mon. 659.....	1,995.3 1,858.6	Mon. 690.....	48 59 58.06 100 43 34.83	90 02 55 270 01 47	Mon. 689..... Mon. 691.....	1,956.4 3,074.4
Mon. 659.....	48 59 57.21 101 40 21.36	89 54 51 269 53 38	Mon. 658..... Mon. 660.....	1,858.6 1,876.0	Mon. 691.....	48 59 57.98 100 41 03.57	90 03 41 270 01 29	Mon. 690..... Mon. 692.....	3,074.4 3,074.5
Mon. 660.....	48 59 57.31 101 38 49.07	89 54 48 269 53 32	Mon. 659..... Mon. 661.....	1,876.0 2,219.5	Mon. 692.....	48 59 57.91 100 38 32.32	90 03 23 270 01 17	Mon. 691..... Mon. 693.....	3,074.5 2,164.7
Mon. 661.....	48 59 57.43 101 36 59.88	89 54 55 269 53 44	Mon. 660..... Mon. 662.....	2,219.5 2,117.0	Mon. 693.....	48 59 57.87 100 36 45.82	90 02 37 270 01 32	Mon. 692..... Mon. 694.....	2,164.7 2,153.2
Mon. 662.....	48 59 57.55 101 35 15.73	89 55 03 269 53 04	Mon. 661..... Mon. 663.....	2,117.0 2,167.7	Mon. 694.....	48 59 57.83 100 34 59.89	90 02 52 270 01 33	Mon. 693..... Mon. 695.....	2,153.2 1,942.3
Mon. 663.....	48 59 57.67 101 33 29.06	89 54 24 269 52 56	Mon. 662..... Mon. 664.....	2,167.7 2,128.0	Mon. 695.....	48 59 57.79 100 33 24.33	90 02 45 270 01 17	Mon. 694..... Mon. 696.....	1,942.3 2,230.1
Mon. 664.....	48 59 57.80 101 31 44.39	89 54 15 269 53 15	Mon. 663..... Mon. 665.....	2,128.0 1,705.2	Mon. 696.....	48 59 57.75 100 31 34.62	90 02 40 270 01 40	Mon. 695..... Mon. 697.....	2,230.1 1,006.9
Mon. 665.....	48 59 57.90 101 30 20.50	89 54 19 269 53 10	Mon. 664..... Mon. 666.....	1,705.2 1,758.3	Mon. 697.....	48 59 57.73 100 30 45.08	90 02 18 270 01 04	Mon. 696..... Mon. 698.....	1,006.9 3,079.5
Mon. 666.....	48 59 58.01 101 28 54.00	89 54 15 269 58 56	Mon. 665..... Mon. 667.....	1,758.3 1,859.4	Mon. 698.....	48 59 57.67 100 28 13.58	90 02 59 269 59 46	Mon. 697..... Mon. 699.....	3,079.5 2,990.7

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 699.....	48 59 57.65 100 25 46.44	90 01 37 270 01 47	Mon. 698.....	2,990.7	Mon. 729.....	48 59 57.90 99 30 33.12	89 55 34 269 54 21	Mon. 728.....	2,275.1
Mon. 700.....	48 59 57.61 100 24 19.61	90 02 52 270 01 25	Mon. 699.....	1,765.1	Mon. 730.....	48 59 57.99 99 28 51.62	89 55 38 269 54 27	Mon. 729.....	2,063.0
Mon. 701.....	48 59 57.55 100 21 59.22	90 03 11 270 01 39	Mon. 701.....	2,853.5	Mon. 731.....	48 59 58.09 99 27 09.96	89 55 44 269 54 12	Mon. 731.....	2,066.4
Mon. 702.....	48 59 57.53 100 21 04.56	90 02 21 269 59 18	Mon. 702.....	2,853.5	Mon. 732.....	48 59 58.19 99 25 26.10	89 55 44 269 54 19	Mon. 730.....	2,066.4
Mon. 703.....	48 59 57.53 100 19 48.30	90 00 16 269 59 26	Mon. 703.....	1,111.1	Mon. 733.....	48 59 58.29 99 23 38.48	89 55 30 269 54 27	Mon. 732.....	2,111.3
Mon. 704.....	48 59 57.53 100 18 18.45	90 00 34 270 00 48	Mon. 704.....	1,550.1	Mon. 734.....	48 59 58.40 99 21 43.82	89 55 40 269 54 31	Mon. 733.....	2,187.5
Mon. 705.....	48 59 57.48 100 15 41.24	90 02 47 270 01 18	Mon. 705.....	1,826.3	Mon. 735.....	48 59 58.51 99 19 40.14	89 55 53 269 54 31	Mon. 734.....	2,330.6
Mon. 706.....	48 59 57.45 100 14 33.62	90 02 09 269 59 25	Mon. 706.....	3,195.6	Mon. 736.....	48 59 58.59 99 19 15.89	89 56 04 269 52 14	Mon. 735.....	2,514.0
Mon. 707.....	48 59 57.44 100 11 48.29	90 01 30 270 00 14	Mon. 707.....	1,374.4	Mon. 737.....	48 59 58.69 99 17 45.45	89 56 04 269 53 34	Mon. 736.....	492.9
Mon. 708.....	48 59 57.43 100 10 27.84	90 01 15 270 00 20	Mon. 708.....	3,360.5	Mon. 738.....	48 59 58.79 99 16 17.06	89 54 47 269 54 06	Mon. 737.....	1,838.2
Mon. 709.....	48 59 57.40 100 08 13.68	90 02 02 270 00 29	Mon. 709.....	1,635.3	Mon. 739.....	48 59 58.88 99 14 46.96	89 54 47 269 54 06	Mon. 738.....	1,796.7
Mon. 710.....	48 59 57.38 100 06 33.58	90 01 45 270 00 19	Mon. 710.....	2,727.0	Mon. 740.....	48 59 58.96 99 13 29.64	89 54 55 269 55 09	Mon. 739.....	1,831.3
Mon. 711.....	48 59 57.34 100 04 02.09	90 02 13 270 00 23	Mon. 711.....	2,034.8	Mon. 741.....	48 59 59.03 99 12 10.68	89 55 14 269 55 01	Mon. 740.....	1,571.7
Mon. 711-A.....	48 59 57.33 100 03 07.72	90 01 04 270 01 04	Mon. 711-A.....	3,079.2	Mon. 742.....	48 59 59.11 99 10 40.53	89 56 08 269 55 01	Mon. 741.....	1,605.0
Mon. 711-B.....	48 59 57.33 100 03 06.23	90 01 05 270 01 05	Mon. 711-B.....	1,105.2	Mon. 743.....	48 59 59.18 99 09 42.75	89 56 09 269 53 13	Mon. 742.....	1,832.4
Mon. 712.....	48 59 57.30 100 01 38.55	90 02 11 270 01 42	Mon. 712.....	30.21	Mon. 744.....	48 59 59.33 99 07 31.88	89 56 09 269 53 13	Mon. 743.....	1,832.4
Mon. 713.....	48 59 57.25 99 59 47.28	90 03 06 270 00 31	Mon. 713.....	1,782.3	Mon. 745.....	48 59 59.33 99 07 31.88	89 56 09 269 53 13	Mon. 744.....	1,174.6
Mon. 714.....	48 59 57.24 99 58 37.53	90 01 24 270 00 34	Mon. 714.....	2,261.7	Mon. 746.....	48 59 59.47 99 05 41.21	89 53 57 269 52 56	Mon. 745.....	2,600.1
Mon. 715.....	48 59 57.19 99 55 52.95	90 02 38 270 00 56	Mon. 715.....	1,417.8	Mon. 747.....	48 59 59.56 99 04 15.34	89 54 35 269 52 54	Mon. 746.....	2,249.5
Mon. 716.....	48 59 57.16 99 54 17.01	90 02 08 270 01 03	Mon. 716.....	2,261.7	Mon. 748.....	48 59 59.64 99 02 59.29	89 54 18 269 53 59	Mon. 747.....	1,745.5
Mon. 717.....	48 59 57.12 99 52 22.56	90 02 30 270 01 37	Mon. 717.....	1,417.8	Mon. 749.....	48 59 59.65 99 02 48.02	89 55 04 269 54 05	Mon. 748.....	1,545.7
Mon. 718.....	48 59 57.08 99 50 41.11	90 02 53 270 00 44	Mon. 718.....	3,345.4	Mon. 750.....	48 59 59.74 99 01 28.71	89 55 02 269 55 03	Mon. 749.....	1,545.7
Mon. 719.....	48 59 57.05 99 49 04.72	90 01 57 270 01 15	Mon. 719.....	1,960.1	Mon. 751.....	48 59 59.80 99 00 35.44	89 55 02 269 55 01	Mon. 750.....	229.2
Mon. 720.....	48 59 56.99 99 46 43.14	90 03 02 269 54 55	Mon. 720.....	2,326.2	Mon. 752.....	48 59 59.82 99 00 06.57	89 55 12 269 53 18	Mon. 751.....	1,611.9
Mon. 721.....	48 59 57.06 99 45 23.50	89 55 55 269 54 49	Mon. 721.....	2,062.3	Mon. 753.....	48 59 59.91 98 58 47.15	89 54 18 269 54 20	Mon. 752.....	1,611.9
Mon. 722.....	48 59 57.13 99 44 06.64	89 55 47 269 54 07	Mon. 722.....	1,959.2	Mon. 754.....	48 59 59.91 98 58 47.15	89 54 18 269 54 20	Mon. 753.....	1,611.9
Mon. 723.....	48 59 57.26 99 41 53.53	89 55 48 269 54 09	Mon. 723.....	2,877.9	Mon. 755.....	49 00 00.04 98 57 27.78	89 54 57 269 51 03	Mon. 754.....	1,613.4
Mon. 724.....	48 59 57.40 99 39 29.27	89 55 58 269 54 25	Mon. 724.....	1,618.7	Mon. 756.....	49 00 00.11 98 56 08.37	89 55 00 269 55 01	Mon. 755.....	1,613.4
Mon. 725.....	48 59 57.53 99 37 04.90	89 56 14 269 54 25	Mon. 725.....	1,562.3	Mon. 757.....	49 00 00.19 98 54 49.10	89 55 00 269 55 01	Mon. 756.....	1,613.4
Mon. 726.....	48 59 57.64 99 35 06.37	89 55 54 269 54 34	Mon. 726.....	2,705.7	Mon. 758.....	49 00 00.23 98 53 29.83	89 55 00 269 55 01	Mon. 757.....	1,613.4
Mon. 727.....	48 59 57.72 99 33 36.98	89 55 42 269 54 40	Mon. 727.....	2,705.7	Mon. 759.....	49 00 00.25 98 52 10.33	89 55 00 269 55 01	Mon. 758.....	1,613.4
Mon. 728.....	48 59 57.79 99 32 25.05	89 55 34 269 54 10	Mon. 728.....	2,705.7	Mon. 760.....	49 00 00.27 98 50 50.85	89 55 00 269 55 01	Mon. 759.....	1,613.4
			Mon. 729.....	2,705.7					

## DESCRIPTION AND DEFINITION OF THE BOUNDARY LINE

157

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 761.....	49 00 00.35	89 58 28	Mon. 760.....	1,614.5	Mon. 793.....	49 00 01.36	89 56 10	Mon. 792.....	1,607.0
	98 46 52.58	269 57 14	Mon. 762.....	1,550.3		98 04 34.86	269 53 43	Mon. 794.....	1,612.8
Mon. 762.....	49 00 00.38	89 58 12	Mon. 761.....	1,550.3	Mon. 794.....	49 00 01.45	89 54 43	Mon. 793.....	1,612.8
	98 45 36.31	269 57 37	Mon. 763.....	1,680.6		98 03 15.51	269 56 37	Mon. 795.....	1,642.4
Mon. 763.....	49 00 00.42	89 58 40	Mon. 762.....	1,680.6	Mon. 795.....	49 00 01.49	89 57 38	Mon. 794.....	1,642.4
	98 44 13.62	269 57 12	Mon. 764.....	1,611.4		98 01 54.71	269 53 38	Mon. 796.....	1,581.7
Mon. 764.....	49 00 00.45	89 58 12	Mon. 763.....	1,611.4	Mon. 796.....	49 00 01.58	89 54 37	Mon. 795.....	1,581.7
	98 42 54.35	269 58 00	Mon. 765.....	1,510.2		98 00 36.90	269 58 23	Mon. 797.....	1,601.1
Mon. 765.....	49 00 00.47	89 58 56	Mon. 764.....	1,510.2	Mon. 797.....	49 00 01.60	89 59 22	Mon. 796.....	1,601.1
	98 41 40.05	269 57 57	Mon. 766.....	1,767.7		97 59 18.12	269 59 00	Mon. 798.....	1,620.1
Mon. 766.....	49 00 00.50	89 59 03	Mon. 765.....	1,767.7	Mon. 798.....	49 00 01.60	90 00 00	Mon. 797.....	1,620.1
	98 40 13.08	269 58 38	Mon. 767.....	1,568.1		97 57 58.42	269 56 18	Mon. 799.....	1,654.6
Mon. 767.....	49 00 00.51	89 59 36	Mon. 766.....	1,568.1	Mon. 799.....	49 00 01.67	89 56 19	Mon. 798.....	1,654.6
	98 38 55.93	269 56 19	Mon. 768.....	1,609.4		97 56 37.01	269 57 46	Mon. 800.....	1,571.1
Mon. 768.....	49 00 00.56	89 57 18	Mon. 767.....	1,609.4	Mon. 800.....	49 00 01.69	89 58 45	Mon. 799.....	1,571.1
	98 37 36.75	269 57 17	Mon. 769.....	1,612.2		97 55 19.72	269 56 44	Mon. 801.....	1,616.7
Mon. 769.....	49 00 00.60	89 58 17	Mon. 768.....	1,612.2	Mon. 801.....	49 00 01.74	89 57 44	Mon. 800.....	1,616.7
	98 36 17.43	269 58 51	Mon. 770.....	1,614.6		97 54 00.18	269 58 00	Mon. 802.....	1,615.4
Mon. 770.....	49 00 00.61	89 59 51	Mon. 769.....	1,614.6	Mon. 802.....	49 00 01.76	89 59 00	Mon. 801.....	1,615.4
	98 34 58.00	269 58 21	Mon. 771.....	1,614.5		97 52 40.70	269 57 22	Mon. 803.....	1,602.3
Mon. 771.....	49 00 00.63	89 59 21	Mon. 770.....	1,614.5	Mon. 803.....	49 00 01.79	89 58 22	Mon. 802.....	1,602.3
	98 33 38.57	269 56 40	Mon. 772.....	1,615.9		97 51 21.87	269 57 36	Mon. 804.....	1,624.7
Mon. 772.....	49 00 00.67	89 57 40	Mon. 771.....	1,615.9	Mon. 804.....	49 00 01.82	89 58 36	Mon. 803.....	1,624.7
	98 32 19.07	269 58 36	Mon. 773.....	1,612.0		97 50 01.94	269 56 20	Mon. 805.....	1,457.6
Mon. 773.....	49 00 00.68	89 59 36	Mon. 772.....	1,612.0	Mon. 805.....	49 00 01.86	89 57 14	Mon. 804.....	1,457.6
	98 30 59.76	269 58 06	Mon. 774.....	1,632.7		97 48 50.23	269 57 58	Mon. 806.....	1,767.5
Mon. 774.....	49 00 00.71	89 59 06	Mon. 773.....	1,632.7	Mon. 806.....	49 00 01.89	89 59 03	Mon. 805.....	1,767.5
	98 29 39.44	269 58 05	Mon. 775.....	1,594.4		97 47 23.27	269 56 56	Mon. 807.....	1,610.4
Mon. 775.....	49 00 00.73	89 59 04	Mon. 774.....	1,594.4	Mon. 807.....	49 00 01.93	89 57 56	Mon. 806.....	1,610.4
	98 28 21.00	269 57 37	Mon. 776.....	1,593.0		97 46 04.04	269 57 26	Mon. 808.....	1,703.5
Mon. 776.....	49 00 00.76	89 58 36	Mon. 775.....	1,593.0	Mon. 808.....	49 00 01.96	89 58 29	Mon. 807.....	1,703.5
	98 27 02.62	269 58 34	Mon. 777.....	1,612.3		97 44 40.23	269 57 37	Mon. 809.....	1,521.9
Mon. 777.....	49 00 00.77	89 59 34	Mon. 776.....	1,612.3	Mon. 809.....	49 00 01.99	89 58 33	Mon. 808.....	1,521.9
	98 25 43.30	269 56 35	Mon. 778.....	1,615.3		97 43 25.36	269 56 21	Mon. 810.....	1,611.3
Mon. 778.....	49 00 00.82	89 57 35	Mon. 777.....	1,615.3	Mon. 810.....	49 00 02.04	89 57 21	Mon. 809.....	1,611.3
	98 24 23.83	269 58 41	Mon. 779.....	1,611.7		97 42 06.09	269 56 23	Mon. 811.....	1,598.8
Mon. 779.....	49 00 00.83	89 59 41	Mon. 778.....	1,611.7	Mon. 811.....	49 00 02.04	90 00 23	Mon. 810.....	1,598.8
	98 23 04.53	269 57 03	Mon. 780.....	1,612.1		97 40 47.43	270 01 17	Mon. 812.....	1,615.3
Mon. 780.....	49 00 00.86	89 58 03	Mon. 779.....	1,612.1	Mon. 812.....	49 00 02.01	90 02 17	Mon. 811.....	1,615.3
	98 21 45.22	269 58 01	Mon. 781.....	1,612.5		97 39 27.96	269 59 30	Mon. 813.....	1,614.6
Mon. 781.....	49 00 00.89	89 59 01	Mon. 780.....	1,612.5	Mon. 813.....	49 00 02.01	90 00 30	Mon. 812.....	1,614.6
	98 20 25.89	269 56 53	Mon. 782.....	1,616.8		97 38 08.53	270 02 16	Mon. 814.....	1,614.0
Mon. 782.....	49 00 00.93	89 57 53	Mon. 781.....	1,616.8	Mon. 814.....	49 00 01.97	90 03 16	Mon. 813.....	1,614.0
	98 19 06.35	269 55 16	Mon. 783.....	1,611.5		97 36 49.12	270 00 14	Mon. 815.....	1,613.2
Mon. 783.....	49 00 00.99	89 56 16	Mon. 782.....	1,611.5	Mon. 815.....	49 00 01.96	90 01 14	Mon. 814.....	1,613.2
	98 17 47.07	270 00 54	Mon. 784.....	1,614.4		97 35 29.75	270 01 03	Mon. 816.....	1,611.7
Mon. 784.....	49 00 00.97	90 01 54	Mon. 783.....	1,614.4	Mon. 816.....	49 00 01.93	90 02 03	Mon. 815.....	1,611.7
	98 16 27.64	269 59 42	Mon. 785.....	1,412.9		97 34 10.46	270 00 33	Mon. 817.....	1,614.0
Mon. 785.....	49 00 00.97	90 00 35	Mon. 784.....	1,412.9	Mon. 817.....	49 00 01.92	90 01 33	Mon. 816.....	1,614.0
	98 15 18.13	269 56 42	Mon. 786.....	658.4		97 32 51.06	270 01 04	Mon. 818.....	1,611.4
Mon. 786.....	49 00 00.99	89 57 07	Mon. 785.....	658.4	Mon. 818.....	49 00 01.89	90 02 04	Mon. 817.....	1,611.4
	98 14 45.74	270 00 05	Mon. 787.....	2,618.7		97 31 31.78	270 00 25	Mon. 819.....	1,611.0
Mon. 787.....	49 00 00.96	90 01 42	Mon. 786.....	2,618.7	Mon. 819.....	49 00 01.88	90 01 25	Mon. 818.....	1,611.0
	98 12 36.90	270 03 02	Mon. 788.....	1,745.3		97 30 12.52	270 00 33	Mon. 820.....	1,610.6
Mon. 788.....	49 00 00.91	90 04 07	Mon. 787.....	1,745.3	Mon. 820.....	49 00 01.86	90 01 33	Mon. 819.....	1,610.6
	98 11 11.04	269 49 30	Mon. 789.....	1,610.1		97 28 53.28	270 00 48	Mon. 821.....	1,610.3
Mon. 789.....	49 00 01.06	89 50 30	Mon. 788.....	1,610.1	Mon. 821.....	49 00 01.84	90 01 48	Mon. 820.....	1,610.3
	98 09 51.83	269 54 48	Mon. 790.....	1,610.7		97 27 34.06	270 00 49	Mon. 822.....	1,612.1
Mon. 790.....	49 00 01.13	89 55 48	Mon. 789.....	1,610.7	Mon. 822.....	49 00 01.82	90 01 49	Mon. 821.....	1,612.1
	98 08 32.59	269 54 30	Mon. 791.....	1,614.2		97 26 14.74	270 00 13	Mon. 823.....	1,612.3
Mon. 791.....	49 00 01.20	89 55 30	Mon. 790.....	1,614.2	Mon. 823.....	49 00 01.81	90 01 13	Mon. 822.....	1,612.3
	98 07 13.17	269 53 42	Mon. 792.....	1,610.8		97 24 55.42	270 01 09	Mon. 824.....	1,613.2
Mon. 792.....	49 00 01.29	89 54 42	Mon. 791.....	1,610.8	Mon. 824.....	49 00 01.79	90 02 09	Mon. 823.....	1,613.2
	98 05 53.92	269 55 10	Mon. 793.....	1,607.0		97 23 36.05	270 03 25	Mon. 825.....	1,612.3

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 825.....	49 00 01.73 97 22 16.73	90 04 25 269 57 27	Mon. 824..... Mon. 826.....	1,612.3 1,612.0	Mon. 854.....	49 00 00.71 96 45 16.07	90 02 29 270 00 59	Mon. 853..... Mon. 855.....	1,612.2 1,615.3
Mon. 826.....	49 00 01.76 97 20 57.42	89 58 27 270 00 36	Mon. 825..... Mon. 827.....	1,612.0 1,609.8	Mon. 855.....	49 00 00.68 96 43 56.60	90 01 59 270 01 10	Mon. 854..... Mon. 856.....	1,615.3 1,606.5
Mon. 827.....	49 00 01.74 97 19 38.22	90 01 36 269 56 29	Mon. 826..... Mon. 828.....	1,609.8 1,609.8	Mon. 856.....	49 00 00.66 96 42 37.56	90 02 10 270 00 16	Mon. 855..... Mon. 857.....	1,606.5 1,619.0
Mon. 828.....	49 00 01.79 97 18 19.02	89 57 29 270 03 54	Mon. 827..... Mon. 829.....	1,609.8 1,609.8	Mon. 857.....	49 00 00.65 96 41 17.91	90 01 16 270 01 53	Mon. 856..... Mon. 858.....	1,619.0 1,616.7
Mon. 829.....	49 00 01.72 97 16 59.82	90 04 53 270 00 14	Mon. 828..... Mon. 830.....	1,609.8 1,610.1	Mon. 858.....	49 00 00.61 96 39 58.37	90 02 53 270 00 56	Mon. 857..... Mon. 859.....	1,616.7 1,605.4
Mon. 830.....	49 00 01.71 97 15 40.61	90 01 14 270 00 13	Mon. 829..... Mon. 831.....	1,610.1 1,610.7	Mon. 859.....	49 00 00.59 96 38 39.39	90 01 55 270 01 06	Mon. 858..... Mon. 860.....	1,605.4 1,610.1
Mon. 831.....	49 00 01.70 97 14 21.36	90 01 13 270 01 13	Mon. 830..... Mon. 832.....	1,610.7 116.1	Mon. 860.....	49 00 00.56 96 37 20.17	90 02 06 269 59 41	Mon. 859..... Mon. 861.....	1,610.1 1,616.0
Mon. 832.....	49 00 01.70 97 14 15.65	90 01 17 270 03 05	Mon. 831..... Mon. 832-A.....	116.1 199.6	Mon. 861.....	49 00 00.56 96 36 00.67	90 00 41 270 01 30	Mon. 860..... Mon. 862.....	1,616.0 1,614.1
Mon. 832-A.....	49 00 01.69 97 14 05.83	90 03 12 270 03 12	Mon. 832..... Mon. 833.....	199.6 1,296.3	Mon. 862.....	49 00 00.53 96 34 41.26	90 02 30 270 00 32	Mon. 861..... Mon. 863.....	1,614.1 1,616.7
Mon. 833.....	49 00 01.65 97 13 02.05	90 04 00 270 01 58	Mon. 832-A..... Mon. 833-A.....	1,296.3 715.1	Mon. 863.....	49 00 00.51 96 33 21.72	90 01 32 269 56 10	Mon. 862..... Mon. 864.....	1,616.7 1,612.8
Mon. 833-A.....	49 00 01.63 97 12 26.88	90 02 24 270 02 24	Mon. 833..... Mon. 833-B.....	715.1 65.7	Mon. 864.....	49 00 00.57 96 32 02.37	89 57 10 270 03 48	Mon. 863..... Mon. 865.....	1,612.8 1,606.3
Mon. 833-B.....	49 00 01.63 97 12 23.64	90 02 27 270 02 27	Mon. 833-A..... Mon. 834.....	65.7 831.0	Mon. 865.....	49 00 00.50 96 30 43.35	90 04 48 270 03 54	Mon. 864..... Mon. 866.....	1,606.3 1,629.9
Mon. 834.....	49 00 01.61 97 11 42.76	90 02 58 270 03 32	Mon. 833-B..... Mon. 835.....	831.0 1,582.8	Mon. 866.....	49 00 00.43 96 29 23.16	90 04 54 270 01 05	Mon. 865..... Mon. 867.....	1,629.9 1,728.0
Mon. 835.....	49 00 01.55 97 10 24.89	90 04 31 270 02 20	Mon. 834..... Mon. 836.....	1,582.8 1,642.9	Mon. 867.....	49 00 00.41 96 27 58.14	90 02 09 270 01 30	Mon. 866..... Mon. 868.....	1,728.0 1,495.6
Mon. 836.....	49 00 01.51 97 09 04.06	90 03 21 270 02 41	Mon. 835..... Mon. 837.....	1,642.9 1,612.3	Mon. 868.....	49 00 00.38 96 26 44.56	90 02 26 270 01 34	Mon. 867..... Mon. 869.....	1,495.6 1,727.2
Mon. 837.....	49 00 01.46 97 07 44.74	90 03 41 270 00 58	Mon. 836..... Mon. 838.....	1,612.3 1,613.2	Mon. 869.....	49 00 00.35 96 25 19.59	90 02 38 270 01 20	Mon. 868..... Mon. 870.....	1,727.2 1,494.2
Mon. 838.....	49 00 01.44 97 06 25.37	90 01 58 270 05 15	Mon. 837..... Mon. 839.....	1,613.2 1,612.9	Mon. 870.....	49 00 00.32 96 24 06.08	90 02 16 270 01 41	Mon. 869..... Mon. 871.....	1,494.2 1,728.4
Mon. 839.....	49 00 01.35 97 05 06.02	90 06 15 270 03 18	Mon. 838..... Mon. 840.....	1,612.9 1,611.9	Mon. 871.....	49 00 00.28 96 22 41.04	90 02 46 270 01 22	Mon. 870..... Mon. 872.....	1,728.4 1,492.4
Mon. 840.....	49 00 01.29 97 03 46.72	90 04 18 270 02 27	Mon. 839..... Mon. 841.....	1,611.9 1,612.3	Mon. 872.....	49 00 00.26 96 21 27.62	90 02 17 270 00 53	Mon. 871..... Mon. 873.....	1,492.4 1,729.2
Mon. 841.....	49 00 01.25 97 02 27.39	90 03 26 270 02 31	Mon. 840..... Mon. 842.....	1,612.3 1,613.8	Mon. 873.....	49 00 00.24 96 20 02.54	90 01 57 270 00 17	Mon. 872..... Mon. 874.....	1,729.2 1,495.9
Mon. 842.....	49 00 01.20 97 01 08.00	90 03 31 269 57 55	Mon. 841..... Mon. 843.....	1,613.8 1,613.1	Mon. 874.....	49 00 00.22 96 18 48.95	90 01 13 270 01 23	Mon. 873..... Mon. 875.....	1,495.9 1,728.2
Mon. 843.....	49 00 01.23 96 59 48.64	89 58 55 270 06 44	Mon. 842..... Mon. 844.....	1,613.1 1,613.1	Mon. 875.....	49 00 00.19 96 17 23.92	90 02 27 270 00 50	Mon. 874..... Mon. 876.....	1,728.2 1,496.1
Mon. 844.....	49 00 01.12 96 58 29.28	90 07 44 270 02 05	Mon. 843..... Mon. 845.....	1,613.1 1,612.2	Mon. 876.....	49 00 00.17 96 16 10.32	90 01 46 270 02 41	Mon. 875..... Mon. 877.....	1,496.1 1,730.7
Mon. 845.....	49 00 01.08 96 57 09.96	90 03 05 270 02 25	Mon. 844..... Mon. 846.....	1,612.2 1,613.3	Mon. 877.....	49 00 00.12 96 14 45.17	90 03 45 270 00 28	Mon. 876..... Mon. 878.....	1,730.7 1,497.0
Mon. 846.....	49 00 01.03 96 55 50.59	90 03 25 270 01 38	Mon. 845..... Mon. 847.....	1,613.3 1,611.8	Mon. 878.....	49 00 00.11 96 13 31.52	90 01 24 270 02 16	Mon. 877..... Mon. 879.....	1,497.0 1,727.4
Mon. 847.....	49 00 01.00 96 54 31.29	90 02 38 270 01 44	Mon. 846..... Mon. 848.....	1,611.8 1,612.9	Mon. 879.....	49 00 00.06 96 12 06.54	90 03 20 270 00 36	Mon. 878..... Mon. 880.....	1,727.4 1,611.6
Mon. 848.....	49 00 00.97 96 53 11.94	90 02 44 270 03 05	Mon. 847..... Mon. 849.....	1,612.9 1,612.0	Mon. 880.....	49 00 00.05 96 10 47.25	90 01 36 270 01 19	Mon. 879..... Mon. 881.....	1,611.6 1,615.8
Mon. 849.....	49 00 00.91 96 51 52.63	90 04 05 270 01 51	Mon. 848..... Mon. 850.....	1,612.0 1,612.7	Mon. 881.....	49 00 00.02 96 09 27.76	90 02 19 270 01 20	Mon. 880..... Mon. 882.....	1,615.8 1,611.1
Mon. 850.....	49 00 00.88 96 50 33.29	90 02 51 270 04 11	Mon. 849..... Mon. 851.....	1,612.7 1,610.3	Mon. 882.....	48 59 59.99 96 08 08.49	90 02 20 270 00 49	Mon. 881..... Mon. 883.....	1,611.1 1,608.9
Mon. 851.....	49 00 00.80 96 49 14.07	90 05 11 270 04 20	Mon. 850..... Mon. 852.....	1,610.3 1,613.0	Mon. 883.....	48 59 59.97 96 06 49.34	90 01 48 270 02 25	Mon. 882..... Mon. 884.....	1,608.9 1,610.0
Mon. 852.....	49 00 00.73 96 47 54.71	90 05 20 269 59 09	Mon. 851..... Mon. 853.....	1,613.0 1,612.4	Mon. 884.....	48 59 59.93 96 05 30.14	90 03 25 270 00 19	Mon. 883..... Mon. 885.....	1,610.0 1,607.2
Mon. 853.....	49 00 00.74 96 46 35.38	90 00 09 270 01 29	Mon. 852..... Mon. 854.....	1,612.4 1,612.2	Mon. 885.....	48 59 59.92 96 04 11.07	90 01 19 270 01 30	Mon. 884..... Mon. 886.....	1,607.2 1,607.8

## BOUNDARY MONUMENTS—GEORGIA STRAIT TO LAKE OF THE WOODS—Continued

Station	Latitude and longitude	Azimuth	To station	Distance (meters)	Station	Latitude and longitude	Azimuth	To station	Distance (meters)
	° ' "	° ' "				° ' "	° ' "		
Mon. 886.....	48 59 59.89 96 02 51.96	90 02 30 270 00 25	Mon. 885..... Mon. 887.....	1,607.8 1,612.3	Mon. 909.....	48 59 56.46 95 22 30.38	90 08 06 270 07 15	Mon. 908..... Mon. 910.....	1,463.5 1,757.6
Mon. 887.....	48 59 59.87 96 01 32.64	90 01 25 270 01 05	Mon. 886..... Mon. 888.....	1,612.3 1,566.8	Mon. 910.....	48 59 56.33 95 21 03.90	90 08 20 270 07 48	Mon. 909..... Mon. 911.....	1,757.6 1,657.7
Mon. 888.....	48 59 59.85 96 00 15.56	90 02 03 270 06 03	Mon. 887..... Mon. 889.....	1,566.8 2,126.6	Mon. 911.....	48 59 56.20 95 19 42.35	90 08 49 270 07 09	Mon. 910..... Mon. 912.....	1,657.7 3,176.0
Mon. 889.....	48 59 59.72 95 58 30.93	90 07 22 270 06 12	Mon. 888..... Mon. 890.....	2,126.6 2,126.0	Mon. 912.....	48 59 55.96 95 17 06.10	90 09 07 269 57 01	Mon. 911..... T. P., Buffalo Bay (Lake of the Woods).	3,176.0 9,664.2
Mon. 890.....	48 59 59.58 95 56 46.34	90 07 31 270 08 47	Mon. 889..... Mon. 891.....	2,126.0 1,748.7	T. P., Buffalo Bay (Lake of the Woods).	48 59 55.96 95 09 10.65	90 02 59 179 58 53	Mon. 912..... Mon. 913.....	9,664.2 20,213.3
Mon. 891.....	48 59 59.42 95 55 20.30	90 09 52 270 06 34	Mon. 890..... Mon. 892.....	1,748.7 2,888.9	Mon. 913.....	49 10 50.28 95 09 10.97	359 58 53	T. P., Buffalo Bay (Lake of the Woods).	20,213.3
Mon. 892.....	48 59 59.22 95 52 53.17	90 08 21 270 06 39	Mon. 891..... Mon. 893.....	2,888.9 2,049.8				Mon. 914.....	1,766.7
Mon. 893.....	48 59 59.08 95 51 17.32	90 07 55 270 07 19	Mon. 892..... Mon. 894.....	2,049.8 2,678.7	Mon. 914.....	49 11 47.47 95 09 11.00	359 58 53 179 58 53	Mon. 913..... Mon. 915.....	1,766.7 1,834.5
Mon. 894.....	48 59 58.88 95 49 05.54	90 08 58 270 06 42	Mon. 893..... Mon. 895.....	2,678.7 2,572.2	Mon. 915.....	49 12 46.85 95 09 11.03	359 58 53 179 58 53	Mon. 914..... Mon. 916.....	1,834.5 1,969.2
Mon. 895.....	48 59 58.69 95 46 58.99	90 08 17 270 06 42	Mon. 894..... Mon. 896.....	2,572.2 2,588.2	Mon. 916.....	49 13 50.59 95 09 11.06	359 58 53 179 58 53	Mon. 915..... Mon. 917.....	1,969.2 1,826.0
Mon. 896.....	48 59 58.51 95 44 51.66	90 08 18 270 07 07	Mon. 895..... Mon. 897.....	2,588.2 3,018.0	Mon. 917.....	49 14 49.70 95 09 11.09	359 58 53 179 58 53	Mon. 916..... Mon. 918.....	1,826.0 2,503.5
Mon. 897.....	48 59 58.28 95 42 23.18	90 08 59 270 07 25	Mon. 896..... Mon. 898.....	3,018.0 3,020.4	Mon. 918.....	49 16 10.74 95 09 11.13	359 58 53 179 58 53	Mon. 917..... Mon. 919.....	2,503.5 2,062.1
Mon. 898.....	48 59 58.05 95 39 54.58	90 09 17 270 11 06	Mon. 897..... Mon. 899.....	3,020.4 417.9	Mon. 919.....	49 17 17.49 95 09 11.16	359 58 53 179 58 53	Mon. 918..... Mon. 920.....	2,062.1 2,110.8
Mon. 899.....	48 59 58.00 95 39 34.02	90 11 21 270 05 31	Mon. 898..... Mon. 900.....	417.9 1,430.6	Mon. 920.....	49 18 25.81 95 09 11.20	359 58 53 179 58 53	Mon. 919..... Mon. 921.....	2,110.8 1,803.8
Mon. 900.....	48 59 57.92 95 38 23.64	90 06 24 270 05 27	Mon. 899..... Mon. 901.....	1,430.6 1,431.2	Mon. 921.....	49 19 24.20 95 09 11.23	359 58 53 179 58 53	Mon. 920..... Mon. 922.....	1,803.8 2,687.1
Mon. 901.....	48 59 57.84 95 37 13.22	90 06 20 270 07 32	Mon. 900..... Mon. 902.....	1,431.2 2,602.0	Mon. 922.....	49 20 51.18 95 09 11.27	359 58 53 179 58 53	Mon. 921..... Mon. 923.....	2,687.1 1,781.5
Mon. 902.....	48 59 57.64 95 35 05.21	90 09 09 270 07 27	Mon. 901..... Mon. 903.....	2,602.0 2,596.8	Mon. 923.....	49 21 48.85 95 09 11.30	359 58 53 179 58 53	Mon. 922..... Mon. 924.....	1,781.5 764.6
Mon. 903.....	48 59 57.44 95 32 57.45	90 09 04 270 07 44	Mon. 902..... Mon. 904.....	2,596.8 2,417.0	Mon. 924.....	49 22 13.60 95 09 11.31	359 58 53 179 58 53	Mon. 923..... Mon. 925.....	764.6 792.7
Mon. 904.....	48 59 57.24 95 30 58.54	90 09 14 270 07 36	Mon. 903..... Mon. 905.....	2,417.0 2,419.2	Mon. 925.....	49 22 39.26 95 09 11.32	359 58 53 179 58 53	Mon. 924..... T. P. 1, N. W. Angle Inlet, Lake of the Woods.	792.7 768.8
Mon. 905.....	48 59 57.05 95 28 59.52	90 09 06 270 07 16	Mon. 904..... Mon. 906.....	2,419.2 2,387.7					
Mon. 906.....	48 59 56.87 95 27 02.05	90 08 45 270 07 12	Mon. 905..... Mon. 907.....	2,387.7 1,923.2	T. P. 1, N. W. Angle Inlet, Lake of the Woods.	49 23 04.14 95 09 11.34	359 58 53 89 58 31	Mon. 925..... Ref. Mon. 2.....	768.8 386.6
Mon. 907.....	48 59 56.73 95 25 27.43	90 08 24 270 07 25	Mon. 906..... Mon. 908.....	1,923.2 2,135.2				Ref. Mon. 1.....	465.1
Mon. 908.....	48 59 56.57 95 23 42.38	90 08 44 270 07 12	Mon. 907..... Mon. 909.....	2,135.2 1,463.5					

<sup>1</sup> The geographic coordinates used by the two Governments in the treaty of 1925 to define the location of this point are latitude 49°23'04" N., longitude 95°09'11" W. These coordinates were based on the original North American datum which, since the treaty of 1925, has been superseded by the North American datum of 1927, the geodetic datum on which all geographic positions of this section of the International Boundary Line are based.



GEOGRAPHIC POSITIONS OF MARKS AND MONUMENTS RANGING AND REFERENCING  
THE INTERNATIONAL BOUNDARY FROM THE GULF OF GEORGIA (GEORGIA STRAIT)  
TO THE NORTHWESTERNMOST POINT OF LAKE OF THE WOODS

Range Marks and Monuments	Latitude and longitude	Azimuth	Distance (meters)	To Range Marks and Monuments
<b>WEST SHORE POINT ROBERTS</b>				
Offshore range mark <sup>1</sup> ranging the course of the boundary westward through Georgia Strait from Monument 0 (zero).	49 00 08.10 123 06 39.52	270 04 40 270 04 40	1,579.8 1,674.1	Monument 0 (zero). Shore range mark, west shore Point Roberts.
Shore range mark <sup>2</sup> ranging the course of the boundary through Georgia Strait westward from Monument 0 (zero).	49 00 08.02 123 05 17.16	90 05 40 90 06 268 02	1,674.1 94.30 4.15	Offshore range mark, west shore Point Roberts. Monument 0 (zero). Monument 1.
<b>WEST SIDE BOUNDARY BAY</b>				
Shore range mark <sup>1</sup> ranging the course of the boundary eastward from Monument 4 to Monument 5.	49 00 08.11 123 02 02.07	89 53 43 269 53 43 269 53 43	75.11 1,095.1 20,337.0	Monument 4. Offshore range mark, west side Boundary Bay. Monument 5.
Offshore range mark <sup>1</sup> ranging the course of the boundary eastward from Monument 4 to Monument 5.	49 00 08.18 123 01 08.19	89 54 23 89 54 23 269 54 23	1,170.2 1,095.1 19,241.9	Monument 4. Shore range mark, west side Boundary Bay. Monument 5.
<b>EAST SIDE BOUNDARY BAY</b>				
Offshore range mark <sup>1</sup> ranging the course of the boundary westward from Monument 5 to Monument 4.	49 00 08.21 122 46 50.14	90 05 11 270 05 11 270 05 11	18,610.2 1,801.9 1,807.4	Monument 4. Monument 5. Shore range mark, east shore Boundary Bay.
Shore range mark <sup>2</sup> ranging the course of the boundary westward from Monument 5 to Monument 4.	49 00 08.11 122 45 21.21	90 06 18 90 06 18 90 06 18	20,417.6 1,807.4 5.50	Monument 4. Offshore range mark, east side Boundary Bay. Monument 5.
<b>LAKE OF THE WOODS</b>				
Reference Monument 1 (east reference).....	49 23 04.15 95 08 48.28	89 58 50 89 58 50	465.1 851.7	Turning point 1, Northwest Angle Inlet, Lake of the Woods. Reference Monument 2.
Reference Monument 2 (west reference).....	49 23 04.13 95 09 30.50	269 58 20 269 58 20	386.6 851.7	Turning point 1, Northwest Angle Inlet, Lake of the Woods. Reference Monument 1.

<sup>1</sup> This range mark, being exactly on the boundary, is also a boundary mark.

<sup>2</sup> This range mark is 0.155 meter south of the boundary.

<sup>3</sup> This range mark is 0.013 meter south of the boundary.

We certify that the foregoing is a true and accurate description and definition of the International Boundary Line between the United States of America and the Dominion of Canada from the Gulf of Georgia (Georgia Strait) to the Northwesternmost Point of Lake of the Woods, as reestablished by the Commissioners and as marked by them on the quadruplicate sets of fifty-nine accurate modern maps submitted with this report, in accordance with the provisions of Articles VI and VII of the Treaty between the United States and Great Britain signed at Washington April 11, 1908, and of Articles I, II, and IV of the Treaty between the United States and His Britannic Majesty in respect of the Dominion of Canada, signed at Washington February 24, 1925.

Washington,  
October 27, 1937.

*Thomas Rags*

United States Commissioner.

*W. E. Osler*

His Britannic Majesty's Commissioner.

## CONCLUSION

It is to be noted that with the submission of this report the terms of the treaty between the two Governments, signed at Washington April 11, 1908, have been fully carried out. The boundary between the United States and the Dominion of Canada from the Atlantic Ocean to the Pacific Ocean is now effectively marked throughout upon the ground by durable monuments and marks, laid down upon accurate modern charts or maps, and described in terms of a geodetic datum common to the two countries in interest. Its present state of effective demarcation and the provisions for continuous maintenance made by the two Governments in the treaty signed February 24, 1925, make it reasonably certain that a complete reestablishment of any portion of this boundary line will never again be necessary.

The reestablishment of the boundary from Georgia Strait to Lake of the Woods, described in this report, was begun by His Britannic Majesty's Commissioner W. F. King and United States Commissioners O. H. Tittmann and Charles D. Walcott in 1901. In conjunction with work on other parts of the International Boundary it was continued, following resignations and deaths, successively by Commissioners E. C. Barnard, E. Lester Jones, and James H. Van Wagenen for the United States, and by Commissioners J. J. McArthur and J. D. Craig for His Britannic Majesty. The work was completed by the present Commissioners, Thomas Riggs for the United States, and Noel J. Ogilvie for His Britannic Majesty.

The preparation of this report was begun by Commissioners James H. Van Wagenen and Noel J. Ogilvie. It is with sorrow that we have to record the untimely death on May 17, 1935, of Mr. Van Wagenen, who for twenty-five years ably served the International Boundary Commission, as Topographic Engineer, Engineer to the Commission, and, from 1929 to his death, as Commissioner. We wish to bear witness to his excellent qualities as a public servant.

In accomplishing the results set forth herein the Commissioners have had the close cooperation and assistance of other departments and agencies of the two Governments. They refer particularly to the joint work of the Geodetic Survey of Canada and the United States Coast and Geodetic Survey in establishing the first-order control for the boundary triangulation; to the excellent work of the United States Geological Survey in printing the boundary maps; and to the many courtesies extended by the customs and immigration officials of both countries during the progress of the field work.

The Commissioners also desire to express their appreciation of the efficient and conscientious services of all their assistants who have taken part in the work. They are particularly indebted to Mr. Jesse Hill, Engineer to the United States Section of the Commission; to Mr. J. A. Pounder, D. L. S., Engineer to the Canadian Section of the Commission; to Mr. J. G. Hefty and Mr. Frank H. Brundage, Topographic

Engineers of the United States Section of the Commission; and to Mr. G. T. Prinsep, D. L. S., and Mr. D. F. Chisholm of the Canadian Section of the Commission. The competent and painstaking work done by these men in the field and in the office is worthy of the highest commendation.

It is most gratifying to state that throughout the course of the work of carrying out the provisions of the boundary treaties the most cordial relations have existed between the Commissioners and between their assistants in both countries, and that their duties have been performed in a spirit of hearty cooperation.

Washington,  
October 27, 1937.

  
*United States Commissioner.*

  
*His Britannic Majesty's Commissioner.*

## APPENDIX I

### HISTORICAL SKETCH

This historical sketch is presented in order to show to some extent how and why the section of the International Boundary between the United States and Canada from Georgia Strait to Lake of the Woods has been adopted as such by the two countries.

The historical background of all the boundary between the United States and Canada has its beginning in the earliest discoveries, explorations, and settlements of the North American Continent by European nations. As soon as Columbus returned from his first voyage and reported the existence of islands and a continent to the west, partitioning of the newly discovered territory between the European nations was begun. In 1493 Pope Alexander VI issued a bull defining a line of separation of the spheres of influence of the Kingdoms of Spain and Portugal. The following year these two countries agreed by treaty upon a different line, somewhere near the present meridian of 60 degrees. All territories east of this line were to belong to Portugal, while all those west of it were to fall within the Spanish sphere. This partitioning, however, was not recognized by England and France and it soon disappeared. But partitioning of the newly discovered continent did not cease. Claims to territory by discovery, exploration, and settlement were set up by Portugal, Spain, France, England, and Holland, and in the northwest by Russia, with consequent overlapping boundaries in a country of which the geography was almost wholly unknown.

At the time the independence of the United States was recognized, the claims of European countries to different portions of the eastern part of the North American Continent were fairly well recognized although the actual boundaries separating them had not yet been laid down upon the ground. The possessions of the United States were quite clearly set forth in the Treaty of Paris, September 3, 1783, but the actual boundaries were as yet undetermined.

Originally the United States possessions extended west as far as the Mississippi River and south to latitude 32°. To the west and south was Spanish territory. Thus the mouth of the great river was under foreign control, as Spain possessed both banks at that time.

The free navigation of the Mississippi was a matter of vital concern to the United States, whose western line of settlements depended upon the river as a highway to the markets and whose products and imports must pass through its mouth. By treaty with Spain in 1795 the right was secured to deposit merchandise and effects of United States citizens at New Orleans. Article XXII of this treaty, which has to do with right of deposit is in part as follows:

\* \* \* his Catholic Majesty will permit the Citizens of the United States for the space of three years from this time to deposit their merchandise and effects in the Port of New Orleans,

and to export them from thence without paying any other duty than a fair price for the hire of the stores, and his Majesty promises either to continue this permission \* \* \*, or if he should not agree to continue it there, he will assign to them on another part of the banks of the Mississippi an equivalent establishment.

Therefore, when it was rumored that Spain had ceded Louisiana to France,<sup>1</sup> fears were at once aroused lest the French should exercise a more exclusive and vigorous policy than had the Spaniards. Following this rumor, came the announcement that the Spanish governor had proclaimed that the right of deposit no longer existed. This produced an outburst of intense indignation from the Americans, and remonstrance came from the settlers and planters on lands tributary to the Mississippi. Their inference was that a policy of exclusion was to be the order, which would mean the loss of navigation rights along the Mississippi, the extinction of American commerce, and the abandonment of flourishing communities already there established. When the actual fact of the retrocession of Louisiana from Spain to France in the Treaty of San Ildefonso in 1800 became known, it only increased the previous ill feeling caused by the rumor.

War between France and Great Britain was imminent. The United States therefore determined to press negotiations upon France at once. It was suggested that if France declined to cede New Orleans to the United States, then sufficient territory should be sought upon which to establish a large commercial town on the bank of the river; or if unable to procure complete jurisdiction over any convenient spot whatsoever, the envoys were instructed to secure a right of deposit with the privilege of holding real estate for commercial purposes. The exigency seemed to require the best effort and the best talent, and to that end James Monroe was selected to cooperate with Robert Livingston, the United States Minister to Napoleon's court.

Napoleon, now confronted with the certainty of a gigantic war with Great Britain, knew that colonies far distant across the seas must be protected by sufficient naval forces and at great cost. Great Britain was a great naval power while France in this respect was far inferior. It required but little reflection for Napoleon to appreciate the disastrous consequences if immediate action by him should not be adopted as to Louisiana. He therefore authorized the sale of Louisiana, and for \$15,000,000 the territory was ceded to the United States by the treaties ratified and proclaimed October 21, 1803.

At the time the treaty for the cession of Louisiana to the United States was concluded, the Spaniards still remained in possession of the country. The Spanish Government had already protested against the transfer of Louisiana to the United States as being contrary to the engagements previously made by France, of which, however, no proof was shown; and some disposition was at first manifested on the part of the Spanish authorities at New Orleans, and in the Provinces of Mexico adjacent, to dispute the entrance of the Americans. This opposition was, however, soon abandoned.

<sup>1</sup> The Louisiana Territory was originally a French possession. New Orleans was founded as a French settlement in 1718. France ceded the territory to Spain in 1762. Spain took actual possession in 1769 and remained in possession by title until the secret Treaty of San Ildefonso in 1800 by which she receded the territory to France.

The limits of the Louisiana Territory had never been definitely set forth. On the south and the west was Spanish territory; on the north was British territory. As to whether the Louisiana Territory extended west of the summit of the Rocky Mountains is a question on which authorities are not in accord, but it seems to have been quite generally understood that it did extend that far. Negotiations for the adjustment of the lines which were to separate their respective territories were commenced by the United States and Spain at Madrid in 1804. The results of these negotiations have here no further interest except as to the western limits of the Louisiana Territory which will be touched on later.

The northern limits of the Louisiana Territory now became a question between Great Britain and the United States, and negotiations toward a settlement of the question were soon begun.

Before giving an account of these negotiations it would be well to set forth briefly the status of Great Britain's possessions to the north.

The precise lines of boundary which divided the territories formerly belonging to the Crowns of England and France in America seem never to have been distinctly defined. The voyages of discovery by the English and by the French to the east coast of North America and their endeavors to form settlements on the new continent had been nearly contemporaneous; and as both nations indefinitely laid claims to extensive dominions, of which neither had the power of taking actual possession, it was inevitable that the claims of the two nations should become incompatible.

Before the cession of Canada to Great Britain by France in 1763, French explorers, traders, and trappers had explored the country and extended their operations westward from the settlements on the St. Lawrence River through the Great Lakes and beyond, as far as what is now the Dakotas and Manitoba. Pierre de La Vérendrye is even credited with reaching the foothills of the Rocky Mountains. Outstanding among these French explorers were: Groseilliers and Radisson, the adventurous brothers-in-law who began their wandering adventures in 1654 and who later were largely responsible for the organization of the Hudson's Bay Company in 1670; Daniel Greysolon, Sieur Dulhut; Jacques de Noyon, who pursued a search for the "Western Sea"; Lieutenant La Noüe; Sieur de La Vérendrye and his three sons, who so persistently followed the search for the "Western Sea" from 1731 to 1749; St. Pierre; and La Corne.

The detailed history of the activities of these adventurous spirits, although fascinating reading, cannot be included in this short sketch. It is sufficient to state that they established a canoe route from the St. Lawrence through the Ottawa River and the Great Lakes and connecting waterways as far west as Lake of the Woods, Lake Winnipeg, and the Red River. They established trading posts along the route, developed an extensive and profitable fur trade with the Indians, and added immeasurably to the geographic knowledge of the country.

After the cession of Canada to Great Britain in 1763, explorations chiefly in the interests of trapping and trading with the Indians under the auspices of the two great fur companies, the Hudson's Bay Company and the North West Company, were carried farther westward by expeditions headed by English-speaking employees of the

two companies. The occupancy of the country by the fur companies followed these explorations.

The Hudson's Bay Company not only enjoyed the sole privileges of trade and commerce under its charter, but also had the privilege of government. The charter, granted by Charles II in the year 1670, reads in part as follows:

\* \* \* AND WHEREAS the said Undertakers, for their further Encouragement in the said Design, have humbly besought Us to incorporate them, and grant unto them, and their Successors, the sole Trade and Commerce of all those Seas, Streights, Bays, Rivers, Lakes, Creeks, and Sounds, in whatsoever Latitude they shall be, that lie within the entrance of the Streights commonly called Hudson's Streights, together with all the Lands, Countries and Territories, upon the Coasts and Confines of the Seas, Streights, Bays, Lakes, Rivers, Creeks, and Sounds, aforesaid, which are not now actually possessed by any of our Subjects, or by the Subjects of any other Christian Prince or State; \* \* \* We give, grant, and confirm, unto the said Governor and Company, and their Successors, the sole Trade and Commerce of all those Seas, \* \* \* with the Fishing of all Sorts of Fish, Whales, Sturgeons, and all other Royal Fishes, in the Seas, Bays, Inlets, and Rivers within the Premises, and the Fish therein taken, together with the Royalty of the Sea upon the Coasts within the Limits aforesaid, and all Mines Royal, as well discovered as not discovered, of Gold, Silver, Gems, and precious Stones, to be found or discovered within the Territories, Limits, and Places aforesaid \* \* \* AND FURTHER [we create] the Said Governor and Company for the Time being, and their Successors, the true and absolute Lords and Proprietors of the same Territory, Limits, and Places aforesaid.

Without quoting further, the charter granted to the company all the powers of government, both civil and criminal according to the laws of England, the right to employ armed force, to appoint commanders, and to erect forts. All these rights and powers granted to the company by the charter were held until 1869, when a large part of them were ceded to the Canadian Government on agreed terms.

From this it will be seen that the Hudson's Bay Company was a most important commercial and political factor in the development of the western frontiers and was consequently a strong influence upon the final agreement as to the location of the International Boundary west of Lake of the Woods.

At the time the Hudson's Bay Company was organized, 1670, Canada was in the possession of France. Therefore, the possessions of the Hudson's Bay Company were involved in the several disputes and wars between Great Britain and France regarding territorial possessions prior to the cession of Canada to England. Consequently, attempts had been made to define the boundaries of the Hudson's Bay Company's possessions in the Treaty of Ryswick in 1697 and again in the Treaty of Utrecht in 1713.

The Treaty of Ryswick of 1697 provided for the appointment of commissioners to determine the boundary between the possessions of France and those of Great Britain in the area around Hudson Bay but apparently without definite result.

The Treaty of Utrecht of 1713 provided for the appointment of commissioners for the same purpose. In 1714 the Hudson's Bay Company made representations to the Lords of Trade regarding the area in which it might trade, urging that the boundary be fixed as follows: "\* \* \* from the said lake (Mistassini) a line to run southwestward into 49 degrees north latitude \* \* \* and that that latitude be the limit; that the French do not come to the north of it nor the English to the south

of it." The British commissioners under the Treaty of Utrecht were instructed to endeavor to get the limits claimed by the Hudson's Bay Company but that "the said boundaries be understood to regard the trade of the Hudson's Bay Company only; that His Majesty does not thereby recede from the right to any lands in America, not comprized within the said boundaries and that no pretention be thereby given to the French to claim any tracts of land in America, southward or southwest of the said boundaries."

Although the commissioners under the Treaty of Utrecht failed to reach any agreement, certain British geographers of the time adopted the contention that the 49th parallel should be the southern boundary of the Hudson's Bay Company's territories and so stated it on their maps. It seems probable that this is the origin of the erroneous impression which came to be generally accepted that the commissioners under the Treaty of Utrecht had fixed the 49th parallel as the southern boundary of British territory.

When negotiations between the Government of the United States and that of Great Britain were undertaken respecting the northern boundary of Louisiana, the United States claimed that the line of the 49th degree of north latitude was the northern boundary, on the grounds that this parallel had supposedly been adopted and definitely settled by commissioners appointed under the Treaty of Utrecht in 1713 as the dividing line between the French possessions of Western Canada and Louisiana on the south and the British territories of the Hudson's Bay Company on the north, and that since this treaty had been specifically confirmed in the treaty of 1763 by which Canada and that part of Louisiana east of the Mississippi were ceded to Great Britain, the remainder of Louisiana continued as before, bounded on the north by the 49th parallel.

Greenhow says in regard to this claim: <sup>2</sup>

This conclusion would be undeniable if the premises on which it is founded were correct. The tenth article of the treaty of Utrecht does certainly stipulate that commissaries should be appointed by the governments of Great Britain and France respectively, to determine the line of separation between their possessions in the northern part of America above specified; and there is reason to believe that persons were commissioned for that object; but there is no evidence which can be admitted as establishing the fact that a line running along the 49th parallel of latitude, or any other line, was ever adopted, or even proposed, by those commissaries, or by their governments, as the limit of any part of the French possessions on the north and of the British Hudson's Bay territories on the south.

It is true that, on some maps of Northern America, published in the middle of the last [18th] century, a line drawn along the 49th parallel does appear as a part of the boundary between the French possessions and the Hudson's Bay territories, as settled according to the treaty of Utrecht: but, on other maps, which are deservedly held in higher estimation, a different line, following the course of the Highlands encircling Hudson's Bay, [drainage] is presented as the limit of the Hudson's Bay territory, agreeably to the same treaty; and, in other maps again, enjoying equal, if not greater, consideration, as having been published under the immediate direction of the British government, no line separating those British possessions from Louisiana or Canada is to be seen. \* \* \*

The belief, nevertheless, that the 49th parallel of latitude was fixed, by commissaries [of Great Britain and France] appointed agreeably to the provisions of the treaty of Utrecht, as the

<sup>2</sup> Greenhow; Oregon and California.—Boston, 1844.



northern limit of Louisiana and Western Canada, has been hitherto universally entertained without suspicion in the United States, and has formed the basis of most important treaties.

During the negotiations between the United States and Great Britain respecting this boundary, no attempt was made by Great Britain to dispute the assertions of the United States concerning this supposed 49th parallel boundary line, and eventually that line was agreed upon by the treaty, as far west as "The Stony Mountains", as related in appendix II of this report.

The development of claims to territory west of the Stony, or Rocky, Mountains which influenced the final location of the boundary from the summit of the Rocky Mountains to the Pacific Ocean has its own distinctive historical background.

The earliest explorations of the North Pacific coast were predominantly Spanish. This was possibly due to the fact that Spain early took possession of and colonized the Pacific coast of northern South America and of the narrow southern part of North America and thus established ports on the Pacific from which to operate, while the other European nations, without such bases of operation, were compelled to make the long voyage around Cape Horn to reach the North Pacific.

Bartolome Ferrelo probably was the first explorer to sight the Pacific coast north of latitude  $42^{\circ}$ . He started out under Juan Rodriguez Cabrillo on an expedition sent by the Viceroy of Mexico "to examine the western coast of California as far north as possible and to seek for rich countries and passages toward the Atlantic." He succeeded to the command of the expedition upon the death of Cabrillo, from accident and disease, in the winter of 1542-43. Continuing the work of his predecessor, Ferrelo reached a point on the coast in latitude  $43^{\circ}$  in March 1543. In June 1579 Sir Francis Drake, an Englishman, in quest of a northern passage to the Atlantic, sighted the coast somewhere between latitudes  $42^{\circ}$  and  $48^{\circ}$ . In 1592 the Greek pilot, Juan de Fuca, in the employ of Spain, sailed from Acapulco, Mexico, and probably entered Puget Sound through the strait that now bears his name. In 1602 the Viceroy of Mexico, acting under orders from the Spanish King, sent three ships under the command of Sebastian Vizcaino to make a survey of the west coast. This expedition was conducted in a very efficient manner and a careful survey was made of the coast as far north as latitude  $43^{\circ}$ . Upon the information gathered by this survey were founded the first approximately correct maps of that coast.

Then followed a period of about 170 years during which this part of the west coast of North America seems to have been forgotten or at least neglected by the civilized world. Following this period the Spaniards, operating from Mexico, were again the first to take up the exploration of the coast, this time with a decided purpose of possession.

The first of these exploring expeditions was conducted by Juan Perez in 1774, sailing under the directions of the Viceroy of Mexico with instructions to sail northward to the 60th degree of latitude and then to survey the coasts of America southward, taking possession for the King of Spain of every place at which he might land. He sailed northward to about latitude  $54^{\circ}$  where he sighted land and a high promontory which he named Cape Santa Margareta (now Cape Knox, on the north end of Graham Island). Then proceeding southward along the coast he entered a deep bay in what is now Vancouver Island, in about latitude  $49^{\circ}30'$ , where he remained for

some time trading with the natives. This bay, which he named San Lorenzo, was visited four years later by the English captain, James Cook, and named St. George's Bay, or Nootka Sound. Perez returned to Mexico within the year.

In 1775 Bruno Heceta, with Perez as ensign, in the ship *Santiago*, accompanied by the small schooner *Sonora* in command of Lieutenant Juan Francisco de la Bodega y Quadra, set out from Monterey under instructions from the Viceroy of Mexico to explore the coast as far north as latitude 65°. Sailing northward, they anchored in a small roadstead in latitude 41°10' where they took possession of the country in the name of the King of Spain. From there they continued north and again sighted land in latitude 48°27'. They then examined the coast southward to latitude 47°20'. Near here seven men sent ashore in a small boat were massacred by the natives.

Going northward again, the two vessels were separated in a storm. Heceta then headed back for Monterey. On his way southward he sighted land in about 50° of latitude, again near the 48th parallel, and in latitude 46°17' where he came to an opening in the shore from which came so strong a current that he was unable to enter it. This was doubtless the Columbia River.

Bodega, on the other hand, continued northward with the intention of reaching the 65th parallel according to instructions. In latitude 56° he sighted a lofty snow-capped mountain which he called San Jacinto (now Mount Edgecumbe). He went ashore near here and took possession of the country with the usual formalities. He continued his voyage up the coast as far as the 58th parallel before he started homeward.

In 1779 Bodega was back on the northwest coast with Ignacio Arteago and two ships. On this voyage, while in search of a passage to the Atlantic, they entered a great bay (the present Prince William Sound) containing many islands, and on the western side of the largest island (now Montague Island), they found a good harbor where they cast anchor and took possession of the region for the King of Spain. They gave the harbor the name of Port Santiago. The expedition soon returned to Mexico without having accomplished much in the way of new discoveries.

In the meantime, the coast had again been visited by an English navigator. In 1776 Captain Cook was instructed by the British Government to proceed to the Pacific coast of North America in about latitude 45° and then sail northward along the coast to latitude 65°, where he was to begin "search for such rivers or inlets as might be of considerable extent, and pointing toward Hudson's or Baffin's Bay." Should he find a passage of that description he was to endeavor to sail through it; if, however, he was satisfied there was no such passage sufficient for the purposes of navigation, he was to repair to the Russian establishments in Kamchatka and to explore the seas north of them in further search of a northeast passage from the Pacific Ocean to the Atlantic or North Sea.

Accordingly, he sailed from England in July 1776 in the ship *Resolution*, accompanied by Captain Charles Clerke in the ship *Discovery*. After spending more than a year in the South Pacific he finally reached his main objective on the west coast in 1778. He first saw land in the vicinity of latitude 44°. He did not again see the coast until he sighted a promontory in latitude 48° which he called Cape Flattery.

Cook attempted to find the strait through which Juan de Fuca had sailed in 1592, but concluded from his observations that no such opening existed. He cruised farther northward along the coast and entered the bay that Perez had entered four years before and named Port San Lorenzo. He sailed up the bay about 10 miles and anchored in a commodious harbor (Friendly Cove), where he refitted his vessels and traded with the natives.

Sailing northward from this bay Cook sighted land in about latitude  $55^{\circ}$  and made a careful examination of the coast from that point to latitude  $57^{\circ}$ , where he sighted the cone-shaped lofty mountain peak which Bodega had named Mount San Jacinto. Cook called it Mount Edgecumbe, the name it now bears. Continuing, he sighted a wide opening in the coast which he named Cross Sound and sighted a high mountain which he named Mount Fairweather. He also sighted Mount St. Elias. He entered and named Prince William Sound and also entered what is now known as Cook Inlet, which at first seemed to promise him a passage to the Arctic Sea. He sailed through Bering Sea and on through Bering Strait to latitude  $70^{\circ}41'$ , where he found his passage barred by a wall of ice rising 12 feet above the water and extending as far as the eye could reach. The farthest point visible on the American shore (on the extreme northwestern part of Alaska) he called Icy Cape. Altogether, Cook made an almost continuous survey of the northwest coast of the continent, and the report of his expedition was a material addition to geographic knowledge.

Up to this time there seems to have been but little or no effort made by the exploring expeditions, either the Spanish or the English, to settle or colonize the coasts they explored or to establish and carry on a fur trade with the Indians; but during the next decade such efforts were begun by both the Spanish and the English and shortly afterward by citizens of the United States. In the meantime, almost unknown to the rest of the European nations, until the voyage of Captain Cook, the Russians had been exploring the Alaskan coast from the north and the west and had been establishing settlements for carrying on fur trade with the Indians.

Some adventurous English captains, without license from the British Government and sailing under the Portuguese flag, traded along the coast. Among them were James Hanna, who visited Nootka Sound and traded with the Indians in 1785, and James Hearne, who made a similar voyage in 1786.

In 1786 La Perouse, a distinguished French navigator, visited this coast. Sent out by the French Government in 1785 to explore the Pacific coast north of latitude  $55^{\circ}$ , he spent considerable time in 1786 in the bay at the foot of Mount Fairweather. This bay he named Port des Francais, now Lituya Bay. From there he sailed southward to the Queen Charlotte Islands, which he suspected to be separated from the mainland, although he did not prove it.

In the same year, 1786, an association of British merchants, resident in the East Indies, was organized under the name of the East India Company with the view of opening a trade to the northwest coast of America for the purpose of supplying the Chinese market with furs. To this end they secured a license and began operations. They sent out Captains Lowrie and Guise in two small vessels from Bombay and Captains Meares and Tipping in two smaller vessels from Calcutta. Lowrie and Guise went to Nootka Sound and thence northwest along the coast to Prince

William Sound and returned. Meares and Tipping sailed to the Aleutian Islands and thence to Prince William Sound. Tipping and his vessel were probably lost. Meares spent the winter of 1786-87 in Prince William Sound, where more than half his crew died from want and scurvy.

Captains Portlock and Dixon, in command of the ships *King George* and *Queen Charlotte*, owned by the King George's Sound Company and sailing under a license granted by the South Sea Company, visited the coast in 1786 and 1787. Dixon sailed to the eastward, sighted Mount San Jacinto (Mount Edgecumbe) and visited the inlet on the south side of the mountain, which had been called Port Remedios, but to which he gave the name Norfolk Sound. He also explored the entrance which now bears his name and decided that the land to the south was an island, to which he gave the name Queen Charlotte Island (now Graham Island, of the Queen Charlotte group).

In 1787 two other fur-trading vessels of the King George's Sound Company, the *Princess Royal*, commanded by Captain Duncan, and the *Prince of Wales*, under Captain Colnett, reached the northwest coast. Duncan is credited with definitely ascertaining that the Queen Charlotte Islands are separated from the mainland.

Captain Berkeley, an Englishman, sailing and trading in the *Imperial Eagle* under the flag of the Austrian East India Company in 1787, noted a wide entrance in the coast between latitudes 48° and 49° which was doubtless the same inlet the old Greek pilot Juan de Fuca reported having discovered in 1592. Berkeley did not explore the passage but sailed southwest along that portion of the coast which had not been visited by vessels since Cook's voyage 10 years before. The crew of a boat which he sent ashore were murdered by the Indians in much the same manner and near the same place where the Spaniards of Bodega's crew were massacred in 1775. Berkeley named the island just north of this place Destruction Island, which name it now bears. Bodega had named it Isla de Dolores.

In 1788 two vessels, the *Felice* and the *Iphigenia*, sailed from the Portuguese port of Macao, China, on a trading expedition to the northwest coast. They were under the direction of John Meares and William Douglas. Meares was a lieutenant retired from the British Navy, whose former voyage has already been mentioned, and who published an elaborate narrative of his expeditions. The vessels were ostensibly commanded by Portuguese captains and sailed under the Portuguese flag. This expedition is of special interest as the circumstances connected with it led to the first dispute and the first treaty between civilized nations relative to this part of the world. The dispute reached grave and ominous proportions before it was finally settled by treaties or conventions, and the conventions themselves had a far reaching effect, as through them Great Britain based a claim to the acquirement of rights of possession from Spain.

The two vessels sailed to Nootka Sound, where the construction of a small vessel was begun. Meares, desiring to make an exploring and trading trip while the ship-building was in progress, arranged with the Indian chief Maquinna for land upon which to erect a house to accommodate the men engaged in constructing the ship. The house was finished and a cannon placed to command the cove and Nootka

village. Captain Douglas left in the *Iphigenia* on a trading trip to the north and Lieutenant Meares sailed south in the *Felice*.

Meares on his southward voyage entered the opening previously sighted and reported by Berkeley, in latitude  $48^{\circ} 39'$ . He sent a boat up the inlet for some distance. Upon its return the crew reported that they had proceeded some 30 leagues to a point where the inlet appeared to be some 15 leagues across, and that they had a skirmish with the natives in which some of the men had been injured. Meares gave the inlet the name "Straits of Juan de Fuca."

Meares continued south along the coast and searched for an opening shown on the Spanish charts as River San Roque at about latitude  $46^{\circ}$ , which had been reported by Heceta in 1775. Near this latitude he sighted a promontory and a small bay, but on attempting to enter the bay encountered shoal waters and breakers ahead of the ship, and so failing to find a channel was compelled to withdraw. He named the promontory Cape Disappointment and the bay Deception Bay. He decided that no River San Roque existed as laid down on the Spanish charts and returned to Nootka Sound. On the way back he visited two large bays situated a little northwest of Juan de Fuca Strait, which were called by the natives Clioquot and Nitenat. He named these bays Port Cox and Port Effingham.

Shortly after Meares returned to Nootka, Captain Douglas arrived from Cook's River (Cook Inlet) with the ship *Iphigenia* loaded with furs. Plans were made to take the furs in the *Felice* to Macao and for the *Iphigenia* and the *Northwest America*, the new vessel which by this time had been completed, to sail to the Sandwich Islands for the winter.

Before their departure, however, two American vessels arrived, the *Columbia*, in command of John Kendrick, and the *Washington*, in command of Robert Gray. These ships had sailed from Boston under the American flag and with American papers. The vessels left Boston together in the summer of 1787. After reaching the Pacific they were separated in a violent gale. The *Washington* continued northward toward Nootka Sound, the rendezvous agreed upon, and after sighting land several times in about latitude  $46^{\circ}$ , entered and anchored in a harbor which Gray thought was probably the mouth of the "Great River of the West." The historian Greenhow states that this was probably the mouth of the Columbia River. Differing therefrom, the historian Bancroft states that it was doubtless Tillamook Bay.

At first the natives were friendly, exchanging berries and skins for iron implements, but before the ship left, the men who were sent ashore, although received in the most friendly manner, were later attacked. One of the crew was killed and others were seriously wounded before the boat could regain the vessel. The natives could be kept from boarding the ship only by use of the swivel gun. Gray named this anchorage Murderers Harbor. From there he sailed northward along the coast, failing, however, to note the entrance to Juan de Fuca Strait, and arrived at Nootka Sound in September 1788, where he was aided in entering the harbor by boats from the *Felice* and the *Iphigenia*.

The *Columbia*, from which Gray had been separated by the storm, had put in for repairs at the harbor of the Isle San Juan de Fernandez, off the coast of Chile. Here Kendrick was treated very kindly and assisted in every way in refitting his

vessel by the commandant of the Spanish garrison, Don Blas Gonzalez. After repairs were made, Kendrick continued his voyage and arrived at Nootka Sound a week behind Gray.

Shortly after the arrival of the *Columbia*, Meares left in the *Felice* for China, and in the latter part of October the *Iphigenia* and the *Northwest America* sailed for the Sandwich Islands. The *Columbia* and *Washington* wintered at Nootka, Kendrick and Gray carrying on trade with the Indians.

The Spanish Government became considerably alarmed upon learning of the appearance in the Pacific of a trading vessel flying the American flag and was so displeased with Commandant Gonzalez, for the hospitable treatment he accorded Captain Kendrick, that he was cashiered for remissness.

However, the chief danger to Spanish sovereignty on the Pacific coast appeared to be from the encroachment of the Russians from the north. From the narrative of Cook's expeditions and other recently published works, enough had been learned of the Russian commerce and establishments on the northwest coast to cause the Spaniards to seek first-hand information. In 1788 the Viceroy of Mexico sent out two vessels, the *Princesa* under Estevan Jose Martinez and the schooner *San Carlos* under Gonzalo Lopez de Haro, on an expedition of inquiry, to make an examination of the Russian establishments and posts on the Pacific coast of America, and after the completion of this, to explore the coast southward to California, and particularly to such places convenient for the establishment of Spanish colonies.

On his return Martinez reported eight Russian establishments, all situated east of Prince William Sound; also that two Russian vessels had been sent to found a settlement at Nootka Sound. When this report reached Madrid, remonstrance against such encroachments were addressed by Charles IV, the Spanish sovereign, to Catherine II, the Empress of Russia. The Empress' reply was that orders had been given her subjects to make no settlements in the country belonging to other nations.

Early in 1789, pursuant to the aggressive policy adopted by the Spanish Government, the Viceroy of Mexico again sent out Martinez and Haro, this time to take possession of Nootka in the name of the Spanish sovereign, and directed them "should any Russian or British vessels appear at Nootka, to receive them civilly but at the same time to declare the paramount rights of His Catholic Majesty to that place and the adjacent coasts."

Martinez and Haro arrived at Nootka on May 5, 1789, with well-manned and well-equipped vessels. They found the *Iphigenia* at anchor in Friendly Cove and the *Columbia* at Mawhinna, a few miles farther up. The *Iphigenia* and the *Northwest America* had arrived on April 20 from the Sandwich Islands, where they had wintered. The *Northwest America* had sailed on a trading expedition on April 28 and thus was absent when Martinez arrived.

Martinez immediately notified the commanders of the *Iphigenia* and the *Columbia* that he intended to maintain possession of Nootka as a Spanish port and demanded that they show their papers. As the *Iphigenia* was badly in need of supplies and equipment, her commander prevailed upon Martinez to furnish the necessary articles and to take in payment therefor bills drawn on the Portuguese

merchant Juan Cavallo, whose name appeared on the ship's papers as owner. This, however, was no concession on the part of Martinez, for a few days later he seized the vessel with her cargo and placed her Portuguese captain, Viana, and her supercargo, Douglas, under arrest, giving as excuse that their papers were defective. In order to effect their release and the restoration of the vessel and cargo they were compelled to sign an agreement to pay the full value of the vessel and cargo upon demand should the Viceroy of Mexico declare the seizure lawful. The *Iphigenia*, upon her release, lost no time in getting away from Nootka and eventually arrived in Macao with a valuable cargo of furs. Shortly after the *Iphigenia's* departure from Nootka, the *Northwest America* returned from her trading expedition along the coast with more than 200 sea-otter skins. She was immediately seized by Martinez.

In the meantime, Meares, upon reaching Macao in the *Felice*, found that John Cavallo, the registered owner, had become bankrupt. Following the bankruptcy the real owners or creditors and the King George's Sound Company entered into agreements to unite their interests, and pursuant thereto the *Felice* was sold and the *Argonaut* purchased. The *Argonaut*, under Captain Colnett, and the *Princess Royal*, under Captain Hudson, under licenses from the East India Company and the South Sea Company, were thereupon dispatched to form a permanent settlement on the northwest coast of America, to be under the direction of Captain Colnett. The *Princess Royal* arrived at Nootka just a few days after the seizure of the *Northwest America*.

Martinez, on being informed by Captain Hudson of Cavallo's bankruptcy, announced that he would hold the *Northwest America* for the amount of the bills drawn by the commander of the *Iphigenia*, and she was immediately equipped and sent out on a trading expedition under one of the mates of the *Columbia*.

The officers and crew of the *Princess Royal* had been received and treated with courtesy and respect by Martinez, but when Captain Colnett arrived in the *Argonaut* a little later he was not so fortunate. Although Captain Colnett had been informed by the officers of the *Northwest America* and the *Columbia* of what had happened at Nootka, he was persuaded by Martinez to enter the sound and accepted an invitation on board Martinez's ship to exhibit his papers. During the interview Colnett informed Martinez of his intention to take possession of Nootka and erect a fort under the British flag. Martinez's reply to this was that the place was already occupied by Spanish forces in the name of His Catholic Majesty. This was followed up by the immediate arrest and confinement of Colnett and the seizure of the *Argonaut*, and eventually by the seizure of the *Princess Royal*.

After her cargo was transferred to the Spanish ships, the *Argonaut*, manned by a Spanish crew, with Colnett and his men on board as prisoners, was sent to San Blas, Mexico, where she arrived on August 16, 1789. Colnett and his men were kept prisoners for some months but were eventually released and the *Argonaut* and the *Princess Royal* were restored under the condition that the ships were not to enter any place on the Spanish-American coast for the purpose of settlement or trade with the natives.

Upon his release Colnett refitted the *Argonaut* at San Blas and with the survivors of his crew sailed for Nootka to take possession of the *Princess Royal*. Arriving at Nootka, he found the place deserted, Martinez having sailed for Mexico sometime in November. Colnett continued on to Macao, China, where he arrived in the latter part of 1790. The *Princess Royal* was later returned to him by Lieutenant Quimper under whose command she had been employed in the service of Spain for more than two years. On one of the trips made by Quimper in the *Princess Royal* he entered Juan de Fuca Strait and examined the shores for a hundred miles.

The officers and crew of the *Northwest America*, which had been seized and held for security of debt, and some of the men from the *Argonaut* and *Princess Royal* had been sent to China as passengers on the *Columbia*, payment for their passage and wages being made out of the otter skins taken from the *Princess Royal* by Martinez.

The incidents just described created a serious controversy between the Governments of Great Britain and Spain, even though the ships seized had been restored and Spain had expressed a willingness to make reparations for the seizures. The matter was finally adjusted by the convention known as the Nootka Treaty, signed October 28, 1790, which reads as follows:

ARTICLE I. The buildings and tracts of land situated on the northwest coast of the continent of North America, or on the islands adjacent to that continent, of which the subjects of his Britannic majesty were dispossessed about the month of April, 1789, by a Spanish officer, shall be restored to the said British subjects.

ARTICLE II. A just reparation shall be made, according to the nature of the case, for all acts of violence or hostility which may have been committed subsequent to the month of April, 1789, by the subjects of either of the contracting parties against the subjects of the other; and, in case any of the said respective subjects shall, since the same period, have been forcibly dispossessed of their lands, buildings, vessels, merchandise, and other property, whatever, on the said continent, or on the seas and islands adjacent, they shall be reestablished in the possession thereof, or a just compensation shall be made to them for the losses which they have sustained.

ARTICLE III. In order to strengthen the bonds of friendship and to preserve in future a perfect harmony and good understanding, between the two contracting parties, it is agreed that their respective subjects shall not be disturbed or molested, either in navigating, or carrying on their fisheries, in the Pacific Ocean or in the South Seas, or in landing on the coasts of those seas in places not already occupied, for the purpose of carrying on their commerce with the natives of the country, or of making settlements there; the whole subject, nevertheless, to the restrictions specified in the three following articles.

ARTICLE IV. His Britannic majesty engages to take the most effectual measures to prevent the navigation and the fishery of his subjects in the Pacific Ocean or in the South Seas from being made a pretext for illicit trade with the Spanish settlements; and, with this view, it is moreover expressly stipulated that British subjects shall not navigate, or carry on their fishery, in the said seas, within the space of ten sea leagues from any part of the coasts already occupied by Spain.

ARTICLE V. As well in the places which are to be restored to the British subjects, by virtue of the first article, as in all other parts of the northwestern coasts of North America, or of the islands adjacent, situate to the north of the parts of the said coast already occupied by Spain, wherever the subjects of either of the two powers shall have made settlements since the month of April, 1789, or shall hereafter make any, the subjects of the other shall have free access, and shall carry on their trade without any disturbance or molestation.

ARTICLE VI. With respect to the eastern and western coasts of South America, and to the islands adjacent, no settlement shall be formed hereafter by the respective subjects in such



parts of those coasts as are situated to the south of those parts of the same coasts, and of the islands adjacent, which are already occupied by Spain: provided, that the said respective subjects shall retain the liberty of landing on the coasts and islands so situated for the purpose of their fishery, and of erecting thereon huts and other temporary buildings serving only for those purposes.

ARTICLE VII. In all cases of complaint or infraction of the articles of the present convention, the officers of either party, without permitting themselves to commit any violence or act of force, shall be bound to make an exact report of the affair and of its circumstances to their respective courts, who shall terminate such differences in an amicable manner.

In addition to the 7 articles quoted there was a secret article attached to the convention, which provided that the 6th article should remain in force only as long as no other "establishment shall be formed by any other power" on the said coasts.

Great Britain later appointed Captain George Vancouver and Spain appointed Captain Juan Francisco de la Bodega y Quadra as commissioners to carry out the second article of this convention. They were to meet at Nootka and determine what lands and buildings were to be returned to the British claimants. Vancouver sailed from England in January 1791 in the *Discovery*, accompanied by the *Chatham* under the command of Lieutenant Broughton. Instructions for his conduct as commissioner followed him in the storeship *Dadalus*.

Vancouver and Bodega failed to arrive at an agreement respecting the settlement of claims and the repossession of land. Thereupon, the two Governments entered into a second convention signed February 12, 1793, which set forth the amount of the indemnity which Spain should pay. A third convention was signed January 11, 1794, which provided for the restoration of the land British subjects had been dispossessed of, and the mutual withdrawal from "the said Port of Nootka". The method of procedure was fully set forth in the convention, leaving nothing to the judgment of the commissioners authorized to carry it out. The formal procedure of restoration was carried out at Nootka on March 28, 1795, by Thomas Pearce, First Lieutenant in His Majesty's Marine Forces, for Great Britain, and Brigadier General Jose Manuel de Alva for Spain. During the summer of 1795 the Spanish forces evacuated Nootka in accordance with the terms of the convention. Neither the Spanish nor the English occupied the Port of Nootka thereafter.

The existence of the second and third conventions was unknown in the United States until after the question of boundary had been settled by the Oregon Treaty in 1846.

Going back to the activities of American traders: In the spring and summer of 1789, Captain Gray in the *Washington* traded along the coast north and south of Nootka. On one of these trading expeditions he made an exploration of the whole east coast of the Queen Charlotte Islands, and on a subsequent cruise entered Juan de Fuca Strait and sailed up the inlet for 50 miles in an east-southeast direction, noting that the width of the strait at that distance from the Pacific was about 5 leagues.

On his way back to Nootka with the *Washington*, Gray met the *Columbia* just starting for Canton, China, with the crew of the *Northwest America* aboard. Gray and Kendrick transferred commands; Gray proceeded to China in the *Columbia* and Kendrick with the *Washington* remained on the Pacific coast. Gray landed

the passengers and disposed of the furs in China and then sailed for Boston, where he arrived August 10, 1790, having carried the flag of the United States around the world for the first time.

After parting with Gray, Kendrick sailed through Juan de Fuca Strait, trading with the natives, and returned to the Pacific through a northern passage.

In September 1790, four United States ships sailed from Boston and one from New York for trade on the Pacific coast. Among them were the brig *Hope*, in command of Captain Ingraham, and the *Columbia* in command of Captain Gray. Gray arrived at Clyoquot, just north of the entrance to Juan de Fuca Strait, in June 1791 and proceeded thence to the east coast of the Queen Charlotte Islands where he remained until September examining the coasts of the islands and the mainland between latitudes  $54^{\circ}$  and  $56^{\circ}$ , and trading with the natives. He entered an inlet in latitude  $54^{\circ}23'$  (probably the present Portland Canal), which he explored for a hundred miles to the northeast without reaching its termination.

Gray returned to Clyoquot and built a fortified habitation which he called Fort Defiance, in which he lived until the following spring. During the winter he built a small vessel, the *Adventure*, which in April sailed to Queen Charlotte Sound under the command of Haswell, first mate of the *Columbia*.

Vancouver and Broughton reached the Pacific coast in the spring of 1792. In addition to his duties as commissioner under the provisions of the Nootka Treaty, Vancouver had been instructed to examine the Pacific shores of the American Continent between the 35th and 60th parallels of latitude. They were off Cape Mendocino on the northern California coast in April 1792, and from there cruised northward, examining the coast for any bays or inlets. They noted the discoloration of the water in Deception Bay, named by Meares in 1789 and reported by him to be in latitude  $46^{\circ}10'$ . Like Meares, they found shoal water and breakers and did not enter the bay. Continuing northward, Vancouver and Broughton met the *Columbia* in command of Gray on April 29. Gray informed Vancouver that he also had been off the mouth of a river in latitude  $46^{\circ}10'$  but that the current and breakers had prevented his entering it.

Gray had sailed from Fort Defiance early in April and on his way southward had entered a well-sheltered bay which he named Bulfinch Harbor (now Grays Harbor). Here he remained three days trading with the natives. Continuing southward to Deception Bay, he succeeded in crossing the bar between breakers on May 11, 1792, and found himself to be in a large fresh-water river which he named Columbia in honor of his ship. In the course of the next few days he proceeded up the river some 20 miles and on May 20 recrossed the bar into the Pacific. From the mouth of the Columbia, Gray sailed to the east coast of the Queen Charlotte Islands where his ship struck and was badly damaged. After some difficulty he succeeded in getting his ship to Nootka for repairs. Here he communicated his discovery of the Columbia River to Captain Ingraham of the brig *Hope* from Boston, and to Captain Bodega y Quadra, the Spanish Commissioner. He also furnished Bodega y Quadra a chart of Bulfinch Harbor and the mouth of the Columbia.

Vancouver and Broughton after parting with Gray entered Juan de Fuca Strait and made extensive explorations. They explored and named Port Discovery, Admiralty Inlet, Hood Canal, Puget Sound, and Possession Sound.

Returning to Juan de Fuca Strait, Vancouver and Broughton continued explorations of the inland waters to the northward. They unexpectedly encountered the Spanish schooners *Sutil* and *Mexicana* commanded by Galiano and Valdez. After exchanging information the British and Spanish commanders continued explorations jointly for some weeks to the northward. Vancouver and Broughton eventually reached Queen Charlotte Sound through inland passages and on August 10 emerged into the Pacific and sailed to Nootka. At Nootka Vancouver and the Spanish Commissioner Bodega together compared the notes and charts of the voyages of the English and Spanish through Juan de Fuca Strait and the inland waterways, and agreed to call the great island around which they had sailed the Island of Quadra and Vancouver. Having both received their instructions for conduct as commissioners under the Nootka Treaty they also conferred upon the manner in which the terms of the treaty were to be carried out, but without agreement at the time.

Vancouver then went to Bulfinch Harbor and the Columbia River with the intention of making a thorough examination of each. His ship was unable to cross the bar at the entrance to the Columbia, but Broughton in the *Chatham* succeeded in crossing and went some 12 miles up the river and anchored, and from there explored the river by cutter and launch for some 90 to 100 miles, or as far as Vancouver's Point. Vancouver and Broughton then cruised south along the coast as far as Monterey and thence to the Sandwich Islands for the winter. Vancouver spent the two following summers, 1793 and 1794, in further exploration and charting of the northwest coast. These explorations extended from San Diego in latitude 33° to the Alaska peninsula and Cook Inlet in latitude 60°. Vancouver then concluded that his task was completed and returned to England.

Russia continued her explorations and settlements along the northwest coast. Although her most important operations were north of the 56th parallel, in 1812, Count Romanzoff, by permission of the Governor of California, established a post on the California coast near Bodega Bay just north of San Francisco, ostensibly for the purpose of forming an agricultural establishment for furnishing supplies to the northern posts. The settlement was abandoned in 1841, having been sold to John A. Sutter, the discoverer of gold in California, for \$30,000.

#### EXPLORATIONS OF THE INTERIOR

In 1788 the North West Company, owned and operated by British citizens, established the trading post Fort Chipewyan on the southwest shore of Athabaska Lake in latitude 59°, about midway between Hudson Bay and the Pacific Ocean. In 1792 a party in charge of Alexander Mackenzie left Fort Chipewyan, ascended Peace River, and wintered in the foothills of the Rocky Mountains. Early in June the following year they continued the ascent of Peace River to its source, crossed the watershed to the Fraser River, and descended it for some 250 miles. Then, abandoning canoes, they traveled westward some 200 miles and reached the west coast on July 22, 1793, at the mouth of an inlet in latitude 52°20' which Vancouver had surveyed a few weeks earlier and named Cascade Canal (Cascade Inlet). Mac-

kenzie's party had thus accomplished the first passage across the continent in northern latitudes, almost exactly 300 years after the voyage of discovery by Columbus. Their purpose accomplished, the party retraced their way to Fort Chipewyan.

As has been noted, the Louisiana Purchase in 1803 extended the territory of the United States westward from the Mississippi River to the Rocky Mountains. For the purpose of exploring this acquired territory and finding a practicable route to the Pacific Ocean, Captains Meriwether Lewis and William Clark were commissioned by President Jefferson in 1803 "to explore the River Missouri and its principal branches to their sources, and then to seek and trace to its termination in the Pacific some stream which might offer the most direct and practicable water communication across the continent for the purpose of commerce." On May 14, 1804, Lewis and Clark started up the Missouri River with a party of 28 men. By the end of November they had covered about 1,600 miles and gone as far as latitude 47°21' where they passed the winter among the Mandan Indians. Early in April 1805 they resumed their journey and continued the ascent of the Missouri; they reached the Great Falls of the Missouri in July.

Above the falls they found the river divided into three main branches which they named the Jefferson, the Gallatin, and the Madison. The Jefferson was followed to its source in the southwestern part of the present State of Montana. The party then proceeded overland across the Rocky Mountains and northward to the waters of the southern tributary of the Columbia, now known as Snake River. Embarking on these waters they descended to the mouth of the Columbia which they reached on November 15, 1805.

The party passed the winter at what they called Fort Clatsop, a dwelling they constructed on the south bank near the mouth of the river. In March 1806 they started on their return journey. They followed the Columbia and its tributaries to where they had embarked on them the previous season and then crossed the Rocky Mountains. In preparing for the overland journey the party was divided. Captain Lewis, with a number of men, explored the Bitterroot and Marias Rivers on his way east, while Captain Clark, with his men, went south to the Jefferson, descended it to the mouth of the Gallatin, then crossed a divide to the Yellowstone and descended it to its mouth where he was soon joined by Lewis. Together they then descended the Missouri to St. Louis, where they arrived September 23, 1806.

In the meantime the British fur-trading companies were pushing westward. In 1805 the North West Company assigned to Simon Fraser the task of extending the operations of the company into the territory explored by Mackenzie. Late in that year he ascended the Peace River and built Rocky Mountain House at the eastern extremity of the portage across the Rocky Mountains.

In 1806 Fraser and John Stewart continued along Mackenzie's route to the junction of the Stewart River with the Fraser, ascended the Fraser to what is now called Stewart Lake, and established Fort James. They also began the erection of Fort Fraser on Fraser Lake. In 1807 they built Fort George on the Fraser River at the mouth of the Stewart, and in 1808 they explored the Fraser to tidewater.

In 1808 a United States association called the Missouri Fur Company established posts in the upper Mississippi and Missouri country and beyond the Rocky Moun-

tains. Mr. Henry of this company in 1808 established the first trading post on the waters of the Columbia on a branch of the Lewis (Snake) River. This post was abandoned in 1810 on account of Indian depredations and difficulty of access.

In 1810 Captain Smith of the American ship *Albatross* built a house and planted a garden at Oak Point on the south bank of the Columbia River 49 miles above its mouth, but abandoned them the same year.

In 1810 John Jacob Astor, a citizen of the United States, organized the Pacific Fur Company which sent out a party from New York in the ship *Tonquin* to establish a trading post on the Columbia River near its mouth, and a little later dispatched another party overland for the same purpose. The party on the *Tonquin* entered the mouth of the Columbia in March 1811, landed on the south bank of the river about 10 miles from its mouth, at the point named Fort George by Broughton in 1792, and proceeded to erect a trading post which they christened Astoria. The detachment sent overland, delayed by mishaps, did not reach Astoria until January 1812.

In the meantime the North West Company had founded trading posts on the Kootenai and Flathead Rivers, tributaries of the Columbia, and in 1811 David Thompson of that company descended the northern branch of the Columbia and the main stream to Astoria, where he arrived in July. His party were the first white men to traverse the northern branch of the river. A party of Astorians accompanied David Thompson on his return up the river and established a trading post at the mouth of the Okanogan on the northern or main branch of the Columbia, some five or six hundred miles by river from the ocean. The following year, 1812, the Astorians established a trading post on the Spokane River, a tributary entering the Columbia approximately 100 miles above the Okanogan.

In 1813 the post at Astoria learned of the declaration of war by the United States against Great Britain, and therefore that the arrival of ships from the United States was not to be expected. A little later the post was visited by two representatives of the North West Company with a party of men who brought accounts of the early successes of Great Britain in the war. The officers of the Pacific Fur Company at Astoria rightly concluded that unless help came soon the company must be dissolved. Accordingly, in October 1813, no help having arrived and the likelihood of capture by the British appearing imminent, an agreement was made with the representatives of the North West Company by which all the establishments, furs, and stocks of goods in the Columbia River valley were sold to the North West Company for \$58,000. After this agreement had been signed and while the process of transfer was going on, the British warship *Raccoon* appeared at the mouth of the river and demanded the surrender of the post. This was formally complied with and then Captain Black of the *Raccoon* learned that the contents of the post had already become the property of British subjects by purchase. After the formalities of surrender the name of the post was changed back to Fort George.

The Treaty of Ghent, which terminated the war of 1812, stipulated that "All Territory, places, and possessions whatsoever, taken by either party from the other during the war, or which may be taken after signing this treaty, excepting only

the islands hereinafter mentioned [in the Bay of Fundy], shall be restored without delay \* \* \*." Under this clause of the treaty, Astoria (Fort George) was formally restored to the United States on October 6, 1818.

Thus by the year 1818 both Great Britain and the United States had acquired on the Pacific Coast conflicting interests and claims overlying the already overlapping original claims of Spain and Russia, which had been based on discovery and occupation.

It was in 1818 that the United States and Great Britain finally agreed by treaty upon the boundary from Lake of the Woods to the "Stony Mountains" and at the same time, in article III of that treaty, agreed upon joint occupancy of "any country that may be claimed by either party on the northwest coast of America, westward of the Stony Mountains" without prejudice to the claims of either party or "the claims of any other Power or State."

During the period of "joint occupancy" provided for in the treaty of 1818, much happened to affect the final location of this boundary.

The negotiations begun between the United States and Spain after the Louisiana Purchase, looking toward the settlement of their common boundaries, finally culminated in the treaty of 1819 by which Spain, for a consideration, ceded to the United States East and West Florida and all her rights to territory north of latitude 42° as far as the Pacific Ocean. Also, Russia relinquished by treaties with both the United States and Great Britain all her rights and claims to territory south of latitude 54°40'.

The Hudson's Bay Company took over the North West Company, greatly expanded the fur trade, exercised all the rights of commerce and government authorized by its charter, and became the chief advocate of Great Britain's territorial claims west of the Rocky Mountains.

The fertility of the Columbia River valley and its tributary valleys, the wealth of the forests, and the mild climate of the territory became known in the East, and a stream of American immigration set in. By 1841 the American settlers in the "Oregon territory"<sup>3</sup> (as it had come to be known) had reached such numbers as to make some form of civil government necessary, and two years later, 1843, they organized a provisional government in the name of the United States. The American immigration continued to increase yearly, until in 1845 there were 3,000 actual settlers in this region, making the final settlement of the boundary question imperative.

A compromise of the conflicting claims was finally effected, and the boundary was agreed upon in the treaty between the United States and Great Britain signed June 15, 1846.

<sup>3</sup> The use of the name "Oregon" for this region is credited to Jonathan Carver in 1766 and also to Major Robert Rogers in 1767. It finally came to be generally applied to the area lying between the Rocky Mountains and the Pacific Ocean and extending indefinitely northward from the 42d parallel of latitude. Later it was applied to a narrower area including the drainage of the Columbia River, and after the treaty of 1846 to the area of what is now the states of Oregon, Washington, Idaho, and western Montana and Wyoming.

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For sources of more extended information regarding the subject matter touched upon in the foregoing sketch, the following abbreviated bibliography is appended:

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CANADA AND ITS PROVINCES. Eds., Adam Shortt and Arthur G. Doughty.  
EARLY EXPLORATIONS IN NORTHWEST CANADA. Alexander Begg.  
HISTORY OF OREGON. Hubert Howe Bancroft.  
HISTORY OF THE EXPEDITION UNDER THE COMMAND OF LEWIS AND CLARK. Elliott Coues.  
HISTORY OF THE NORTHWEST. Alexander Begg.  
HISTORY OF THE NORTHWEST COAST. Hubert Howe Bancroft.  
INTERNATIONAL ARBITRATIONS. John Bassett Moore.  
MINNESOTA IN THREE CENTURIES, Vol. I. Warren Upham.  
NEW LIGHT ON THE EARLY HISTORY OF THE GREATER NORTHWEST. Ed., Elliott Coues.  
OREGON AND CALIFORNIA. Robert Greenhow.  
OREGON QUESTION, THE. Albert Gallatin.  
OREGON TERRITORY, THE. Sir Travers Twiss.  
PATHFINDERS OF THE GREAT PLAINS. Lawrence Johnstone Burpee.  
SEARCH FOR THE WESTERN SEA. Lawrence Johnstone Burpee.  
THIRTY YEARS VIEW. Thomas Hart Benton.  
THOMPSON'S NARRATIVE OF HIS EXPLORATIONS IN NORTH AMERICA. Ed., J. B. Tyrrell.  
VOYAGES FROM MONTREAL THROUGH THE CONTINENT OF NORTH AMERICA. Alexander Mackenzie.

## APPENDIX II

### THE BOUNDARY TREATIES

The Provisional Treaty of Peace between the United States and Great Britain, concluded November 30, 1782, and the Definitive Treaty of Peace between the United States and Great Britain, concluded September 3, 1783, both provided in identical terms, in the second article of each treaty, that the northern boundary of the United States should run "Thence through the said Lake [Lake of the Woods] to the most Northwestern Point thereof, and from thence on a due West Course to the River Mississippi." The Mississippi was recognized as the western boundary of the United States in the next words of the two treaties: "Thence by a Line to be drawn along the Middle of the said River Mississippi until it shall intersect the Northernmost Part of the thirty first Degree of North Latitude." The text <sup>1</sup> of article II reads as follows:

#### DEFINITIVE TREATY OF PEACE

*(Signed September 3, 1783; ratifications exchanged May 12, 1784)*

\* \* \* \* \*

#### ARTICLE II

And that all Disputes which might arise in future on the Subject of the Boundaries of the said United States, may be prevented, it is hereby agreed and declared, that the following are and shall be their Boundaries, Viz. From the North West Angle of Nova Scotia, viz. That Angle which is formed by a Line drawn due North from the Source of Saint Croix River to the Highlands[,] along the said Highlands which divide those Rivers that empty themselves into the River St. Lawrence, from those which fall into the Atlantic Ocean, to the Northwesternmost Head of Connecticut River: Thence down along the middle of that River to the forty fifth Degree of North Latitude; From thence by a Line due West on said Latitude until it strikes the River Iroquois or Cataraquy; Thence along the middle of said River into Lake Ontario; through the Middle of said Lake until it strikes the Communication by Water between that Lake & Lake Erie; Thence along the middle of said Communication into Lake Erie; through the middle of said Lake, until it arrives at the Water Communication between that Lake & Lake Huron; Thence along the middle of said Water-Communication into the Lake Huron, thence through the middle of said Lake to the Water Communication between that Lake and Lake Superior, thence through Lake Superior Northward of the Isles Royal & Phelipeaux to the Long Lake; Thence through the Middle of said Long-Lake, and the Water Communication between it & the Lake of the Woods, to the said Lake of the Woods; Thence through the said Lake to the most Northwestern Point thereof, and from thence on a due West Course to the River Mississippi, Thence by a Line to be drawn along the Middle of the said River Mississippi until it shall intersect the Northernmost Part of the thirty first Degree of North Latitude. South, by a Line to be drawn due East from the Determination of the Line last mentioned, in the Latitude of thirty one Degrees North of the Equator to the middle of the River Apalachicola or Catahouche. Thence along the middle thereof to its Junction with the Flint River; Thence strait to the Head of St. Mary's River, and thence down along the middle of St Mary's River to the Atlantic Ocean. East, by a Line to be drawn along the Middle of the River St Croix, from its Mouth in the Bay of Fundy to its Source; and from its Source directly North to the aforesaid Highlands, which divide the

<sup>1</sup> The text of the treaties has been taken from *Treaties and other International Acts of the United States of America*, vols. 2-5, edited by Hunter Miller, Department of State, Washington; 1931-1937. This differs from other published texts only in unimportant details of punctuation, capitalization, division into paragraphs, and order of precedence.



Rivers that fall into the Atlantic Ocean, from those which fall into the River St. Lawrence; comprehending all Islands within twenty Leagues of any Part of the Shores of the United States, & lying between Lines to be drawn due East from the Points where the aforesaid Boundaries between Nova Scotia on the one Part and East Florida on the other, shall respectively touch the Bay of Fundy and the Atlantic Ocean, excepting such Islands as now are or heretofore have been within the Limits of the said Province of Nova Scotia.

It was supposed by the framers of the treaties that the source of the Mississippi was far enough north for a due west line drawn from the most northwestern point of Lake of the Woods to intersect that river. Knowledge to the contrary was possibly in the possession of trappers and fur traders operating in the region, but if so, such knowledge had not been set down on published maps, and the famous Mitchell map, which was one of the maps used by the framers of the treaties, while it does not delineate the source of the Mississippi, carries the following note: "The head of the Mississippi is not yet known. It is supposed to arise about the 50th degree of latitude."

It was not long until doubts arose in regard to the Mississippi's rising so far north and the uncertainty finds expression in article IV of the Jay Treaty concluded November 19, 1794, which reads:

THE JAY TREATY. TREATY OF AMITY, COMMERCE, AND NAVIGATION

(Concluded November 19, 1794; ratifications exchanged October 28, 1795)

\* \* \* \* \*

ARTICLE IV

Whereas it is uncertain whether the River Mississippi extends so far to the Northward as to be intersected by a Line to be drawn due West from the Lake of the woods in the manner mentioned in the Treaty of Peace between His Majesty and the United States, it is agreed, that measures shall be taken in Concert between His Majesty's Government in America, and the Government of the United States, for making a joint Survey of the said River, from one Degree of Latitude below the falls of St Anthony, to the principal Source or Sources of the said River, and also of the parts adjacent thereto, And that if on the result of such Survey it should appear that the said River would not be intersected by such a Line as is above mentioned; The two Parties will thereupon proceed by amicable negotiation to regulate the Boundary Line in that quarter as well as all other Points to be adjusted between the said Parties, according to Justice and mutual Convenience, and in Conformity, to the Intent of the said Treaty.

The joint surveys provided for in the treaty were never made; but David Thompson, geographer for the North West Company (a fur-trading company) visited the source of the Mississippi in 1798 and made latitude observations which placed it far south of Lake of the Woods.

The fifth article of a convention regarding boundaries, negotiated by Lord Hawkesbury and Rufus King on May 12, 1803, provided, that in view of the uncertainty as to the extent of the Mississippi northward, the boundary should be the "shortest line" that could be drawn "between the northwest point of the Lake of the Woods and the nearest source of the River Mississippi."

This convention was never ratified. Before it was acted upon by the United States Senate the treaty between the United States and France of April 30, 1803, for the cession of Louisiana was confirmed.

The territory of Louisiana acquired by this treaty and by the convention of the same date extended the possessions of the United States westward beyond the

Mississippi River and eliminated the question as to the source of the Mississippi by introducing the question of a territorial delimitation between the possessions of Great Britain and the Louisiana territory.

While it is generally conceded that the Louisiana territory extended westward to the Rocky Mountains, authorities are not in accord as to whether it extended west of the Rocky Mountains; but there were other grounds on which the United States claimed territory to the west thereof.

At the same time, the British Government had equally valid claims to territory west of the Rocky Mountains. These claims of the two Governments are set forth in the Historical Sketch (appendix I, p. 178) in this report and are relevant here inasmuch as they overlapped and thus were subjects of diplomatic negotiations between the two Governments for many years—to be precise, until the treaty of 1846 was concluded.

After the conclusion of the Louisiana treaty, the United States Senate advised that the Hawkesbury-King convention relating to boundaries should be ratified without the fifth article. The British Government declined to accept such an amendment. Thus the question of the boundary westward from Lake of the Woods remained unsettled and was in suspense until 1807 when another endeavor was made to adjust it.

On the 31st of December 1806, the commercial articles of the Jay Treaty being about to expire, Messrs. Monroe and Pinkney, as Commissioners of the United States, with Lords Holland and Auckland as British Commissioners, signed a treaty of amity and commerce. After this treaty was concluded the British Commissioners proposed certain additional and explanatory articles, the fifth of which provided that the forty-ninth parallel of north latitude should form the boundary westward from Lake of the Woods “as far as the territories of the United States extend in that quarter”, provided that nothing in the article should be construed “to extend to the northwest coast of America or to the territories belonging to or claimed by either party, on the continent of America to the westward of the Stony Mountains.” The United States Commissioners objected to the words “as far as the territories of the United States extend in that quarter”, and proposed to omit them. The British Commissioners in turn proposed to substitute the words, “as far as their said respective territories extend in that quarter”, and to this proposal the United States Commissioners assented. The proviso in regard to territories west of the Stony Mountains was accepted in the form in which it was proposed. The Government of the United States, however, expressed a desire for the omission of the proviso on the ground that it was unnecessary and could have “little other effect than as an offensive intimation to Spain” that the claims of the United States extended “to the Pacific Ocean.” However “reasonable” such claims might be “compared with those of others,” it was, said Mr. Madison, Secretary of State, impolitic especially at that time, to strengthen Spanish jealousies of the United States. These articles relating to boundaries, however, were not concluded, as President Jefferson refused to submit the treaty itself to the United States Senate on account of objections to the articles relating to amity and commerce.

The question of this boundary next came up during the negotiations at Ghent leading up to the treaty of 1814. The United States plenipotentiaries proposed, in respect of this boundary, the article agreed on by the Commissioners of the United States and Great Britain in 1807. The British plenipotentiaries offered in turn the article first proposed by Lords Holland and Auckland, with an additional paragraph providing for free access by British subjects through the territory of the United States to the Mississippi, and for the free navigation of that river. The substance of an article so far as it related to the boundary line, was finally agreed upon; but the United States plenipotentiaries would not accede to the paragraph relating to the Mississippi, and the whole article was finally omitted from the treaty.

The treaty as finally ratified did not refer to the section of the boundary under discussion other than to provide for the establishment of the Northwesternmost Point of Lake of the Woods in article VII which reads as follows:

TREATY OF PEACE AND AMITY (TREATY OF GHENT)

*(Signed at Ghent December 24, 1814; ratifications exchanged February 17, 1815)*

\* \* \* \* \*

ARTICLE VII

It is further agreed that the said two last mentioned Commissioners after they shall have executed the duties assigned to them in the preceding Article, shall be, and they are hereby, authorized upon their oaths impartially to fix and determine according to the true intent of the said Treaty of Peace of one thousand seven hundred and eighty three, that part of the boundary between the dominions of the two Powers, which extends from the water communication between Lake Huron and Lake Superior to the most North Western point of the Lake of the Woods;—to decide to which of the two Parties the several Islands lying in the Lakes, water communications, and Rivers forming the said boundary do respectively belong in conformity with the true intent of the said Treaty of Peace of one thousand seven hundred and eighty three, and to cause such parts of the said boundary as require it to be surveyed and marked. The said Commissioners shall by a Report or declaration under their hands and seals, designate the boundary aforesaid, state their decision on the points thus referred to them, and particularize the Latitude and Longitude of the most North Western point of the Lake of the Woods, and of such other parts of the said boundary as they may deem proper. And both parties agree to consider such designation and decision as final and conclusive. And in the event of the said two Commissioners differing, or both or either of them refusing, declining, or wilfully omitting to act, such reports, declarations or statements shall be made by them or either of them, and such reference to a friendly Sovereign or State shall be made in all respects as in the latter part of the fourth Article is contained, and in as full a manner as if the same was herein repeated.

No further attempt to settle this boundary was made until the negotiations were under way which resulted in the conclusion of the convention between the United States and Great Britain of October 20, 1818. In these negotiations the United States plenipotentiaries proposed that the line should follow the 49th parallel of north latitude due west to the Pacific Ocean and they set forth their claims to this line by the Louisiana purchase as far as the Rocky Mountains and by the rights of discovery, exploration, and settlement west of the Rocky Mountains. An agreement was readily reached as to the portion of the line east of the Rocky Mountains, but the British plenipotentiaries set up counterclaims to the territory west of the Rocky Mountains. They did not make any formal proposal for a boundary, but intimated, however, that the Columbia River was the most convenient line that could be adopted, and that they would not agree to any arrangement that would not give

them a harbor at the mouth of the Columbia in common with the United States. At the fifth conference the British plenipotentiaries proposed an article to the effect that the country west of the Rocky Mountains lying between the 45th and 49th parallels of latitude should be open to the trade and commerce of both parties without prejudice to the claims of possession by either of them. The United States plenipotentiaries declined to accept the proposal as first made, but in the end an agreement along similar lines was reached which is embodied in article III of the convention.

The agreement adopting the boundary east of the Rocky Mountains is set forth in article II of the convention adopted October 20, 1818, and reads as follows:

#### CONVENTION OF 1818

*(Signed October 20, 1818; ratifications exchanged January 30, 1819)*

\* \* \* \* \*

#### ARTICLE II

It is agreed that a Line drawn from the most North Western Point of the Lake of the Woods, along the forty Ninth Parallel of North Latitude, or, if the said Point shall not be in the Forty Ninth Parallel of North Latitude, then that a Line drawn from the said Point due North or South as the Case may be, until the said Line shall intersect the said Parallel of North Latitude, and from the Point of such Intersection due West along and with the said Parallel shall be the Line of Demarcation between the Territories of the United States, and those of His Britannic Majesty, and that the said Line shall form the Northern Boundary of the said Territories of the United States, and the Southern Boundary of the Territories of His Britannic Majesty, from the Lake of the Woods to the Stony Mountains.

#### ARTICLE III

It is agreed, that any Country that may be claimed by either Party on the North West Coast of America, Westward of the Stony Mountains, shall, together with it's Harbours, Bays, and Creeks, and the Navigation of all Rivers within the same, be free and open, for the term of ten Years from the date of the Signature of the present Convention, to the Vessels, Citizens, and Subjects of the Two Powers: it being well understood, that this Agreement is not to be construed to the Prejudice of any Claim, which either of the Two High Contracting Parties may have to any part of the said Country, nor shall it be taken to affect the Claims of any other Power or State to any part of the said Country; the only Object of The High Contracting Parties, in that respect, being to prevent disputes and differences amongst Themselves.

It will be noted from the wording of article II that the latitude of the most northwestern point of Lake of the Woods was not known by the framers of the treaty. And it will be further noted that the line extends "from the Lake of the Woods to the Stony Mountains." These points are of interest as will appear later when we find the line described in the treaty of 1842 as running south from the most northwestern point of Lake of the Woods to the 49th parallel and find "Rocky Mountains" substituted for "Stony Mountains," and finally, in the treaty of 1908, find a further change to "Summit of the Rocky Mountains," as the terminus of this section of the boundary.

By the treaty concluded February 22, 1819, between the United States and Spain, the United States acquired all of Spain's territorial rights in the Pacific northwest. This left Russia, Great Britain, and the United States as the contestants for territorial possession. Russia's claims to the Alaskan peninsula were well established

and were not contested; but the southern limit of her claims was not definite and was a subject of controversy. Emperor Paul of Russia having named  $55^{\circ}$  of north latitude as the southern limit of certain commercial privileges to his Russian-American Company in 1799, the United States, at least, supposed that latitude to be the southern limit of Russia's claims. This supposition was upset however by the ukase of 1821 by which the Emperor of Russia assumed to exclude all foreigners from carrying on commerce and from navigating and fishing within a hundred Italian miles of the coast from Bering Strait down to the 51st parallel of north latitude. This ukase was necessarily founded upon and carried with it an assertion of title to all territory north of the 51st parallel. Both Great Britain and the United States protested against it. Russia accepted these protests in a friendly spirit and it was agreed that an effort should be made to settle the territorial claims of the parties by negotiation. The negotiations between the United States and Great Britain failed of results and the final outcome was that the United States and Great Britain carried on separate negotiations with Russia. These separate negotiations resulted in the treaty of 1824 between the United States and Russia, in which the southern boundary of Russia's claims was designated as  $54^{\circ}40'$  of north latitude, and the convention of 1825 between Great Britain and Russia, in which the boundary line between the possessions of Great Britain and of Russia were delimited with the same southern limit of  $54^{\circ}40'$ .

By these treaties Russia left it to the United States and Great Britain to settle between themselves their rival claims to territory south of  $54^{\circ}40'$  of north latitude. In 1826, following suggestions from the British Government, negotiations were resumed between the United States and Great Britain. During these negotiations the British plenipotentiaries adhered substantially to the line of the Columbia River, offering the United States, north of that line, a small detached territory "bounded on the west by the ocean, on the north by Fuca's Straits, on the east by the entrance of Admiralty Inlet and the peninsula between that and Hoods Inlet, and on the south by a line drawn thence to Gray's Harbor on the ocean." The United States, while not announcing the 49th parallel as the most southern line that would be accepted, adhered to that line as a basis of negotiation. Failing to reach a settlement the negotiators concluded a convention on August 6, 1827, indefinitely extending the joint occupation provided for in article III of the treaty of 1818, which article was now nearing its 10-year limit. The convention was duly ratified and ratifications were exchanged April 2, 1828. The pertinent articles of the convention, viz, I, II, and III, read as follows:

CONVENTION CONTINUING IN FORCE ARTICLE III OF THE CONVENTION OF  
OCTOBER 20, 1818

*(Signed August 6, 1827; ratifications exchanged April 2, 1828)*

\* \* \* \* \*

ARTICLE I

All the Provisions of the Third Article of the Convention concluded between the United States of America, and His Majesty The King of the United Kingdom of Great Britain and

Ireland, on the Twentieth of October 1818, shall be, and they are hereby, further indefinitely extended and continued in force, in the same manner as if all the Provisions of the said Article were herein specifically recited.

## ARTICLE II

It shall be competent, however, to either of the Contracting Parties, in case either should think fit, at any time after the Twentieth of October 1828, on giving due notice of Twelve Months to the other Contracting Party, to annul and abrogate this Convention: and it shall, in such case, be accordingly entirely annulled and abrogated, after the expiration of the said term of notice.

## ARTICLE III

Nothing contained in this Convention, or in the Third Article of the Convention of the Twentieth of October 1818, hereby continued in force, shall be construed to impair, or in any manner affect, the Claims which either of the Contracting Parties may have to any part of the Country Westward of the Stoney or Rocky Mountains.

The continuance of the joint occupation proved to be inconvenient and irritating, and as time went on and the fertile valleys began to be settled, friction developed to a dangerous degree.

The Webster-Ashburton Treaty, concluded on August 9, 1842, failed to adjust the dispute, though it settled other boundary questions that had long been subjects of controversy. It did, however, redefine the boundary from the most northwestern point of Lake of the Woods to the Rocky Mountains. The latitude and longitude of the most northwestern point of Lake of the Woods had been determined by official surveys in 1825<sup>2</sup> and were made use of in the language of the treaty. The term "Rocky Mountains" was used in this treaty in the place of the "Stony Mountains" of the treaty of 1818. The portion of the second article of the Webster-Ashburton Treaty of 1842 which refers to this boundary reads as follows:

\* \* \* from which the Commissioners traced the line to the most northwestern point of the Lake of the Woods;—thence, along the said line to the said most northwestern point, being in latitude 49°23'55" north, and in longitude 95°14'38" west from the Observatory at Greenwich; thence, according to existing treaties, due south to its intersection with the 49th parallel of north latitude, and along that parallel to the Rocky Mountains. \* \* \*

Returning to the negotiations concerning the boundary west of the Rocky Mountains: Following the treaty of 1842, efforts were made by the British Minister at Washington to renew negotiations but without results.

On May 2, 1843, the American settlers in the "Oregon Territory" (the name by which this country had come to be known), set up a provisional government at a meeting held at Champoege. The English Parliament had extended the colonial jurisdiction and civil laws of Canada to all British subjects on the Pacific coast. Thus there were two governments exercising jurisdiction in the same territory.

In 1844 negotiations were again renewed by Mr. Richard Pakenham who had then become Minister to Washington. These negotiations were interrupted by the death of Mr. Upshur, then Secretary of State. After the lapse of several months the negotiations were resumed by Mr. John C. Calhoun who succeeded Mr. Upshur as Secretary of State. The proposals submitted by Mr. Calhoun on the part of the United States and by Mr. Pakenham on the part of Great Britain were substantially the same as those discussed in London in 1827. Mr. Calhoun, however, offered the

<sup>2</sup> See location of most northwestern point of Lake of the Woods, p. 137.

49th parallel as an ultimatum. In January 1845, no agreement seemed possible, and Mr. Pakenham proposed submitting the dispute to arbitration. This proposal was declined by Mr. Calhoun. Meanwhile the controversy was becoming acute and the conditions in the territory becoming more intolerable. A movement had been made in Congress to erect a territorial government without defining the territorial limits over which its jurisdiction should extend. In May 1844 the Democratic Presidential Convention adopted a declaration popularly interpreted as meaning "fifty-four forty or fight," to the effect that the title of the United States "to the whole of the territory of Oregon" was "clear and unquestionable", and that "no part of the same ought to be ceded to England, or any other power."

President Polk, in his inaugural address in March 1845, repeated the declaration in "the very same words with marks of quotation." The declaration aroused indignation in England, and war seemed imminent.

President Polk, in consideration of the acts of his predecessors and the seriousness of the situation, deemed it to be his duty to make another effort to settle matters. Accordingly Mr. Buchanan, Secretary of State under President Polk, on July 12, 1845, presented proposals of settlement to Mr. Pakenham who rejected them without referring them to his Government. Mr. Buchanan then withdrew the proposals which had been rejected. President Polk, in his annual message to Congress in December 1845, recommended that the notice required by the treaty of 1827 for the termination of the joint occupation be given.

Mr. Pakenham's rejection of Mr. Buchanan's proposals without reference was not approved by the British Government, and Mr. Pakenham urged a renewal of the proposals. The renewal was refused by the President. Mr. Pakenham then urged that the question be submitted to arbitration. This was definitely rejected by Mr. Buchanan on the 3d of January 1846 on the ground that it assumed that the title to a portion of the territory was valid, and thus took for granted "the very question in dispute." Mr. Pakenham then offered to refer to arbitration the question of title in either of the two powers to the whole of the territory; this in turn was declined by Mr. Buchanan.

On February 26, 1846, Mr. Buchanan took the matter up by letter with Mr. McLane, the American Minister, who was specially charged with the discussion of the question in London. Mr. McLane conferred personally with Lord Aberdeen with the result that new instructions were sent to Mr. Pakenham.

On April 27 the President approved a joint resolution of Congress by which he was authorized "at his discretion" to give the requisite notice to terminate the joint occupation under the treaty of 1827. Notice of abrogation of the treaty was conveyed to Lord Aberdeen by Mr. McLane on May 22, 1846.

On the 6th of June 1846 Mr. Pakenham presented to Mr. Buchanan a draft of a treaty. Before authorizing the Secretary of State to sign it, the President submitted this draft to the Senate. After three days' deliberation, the Senate by a vote of 37 to 12 advised the acceptance of the treaty as submitted. On June 15, 1846, the treaty was signed without the alteration of a single word. It was resubmitted to the Senate which gave its "advice and consent" by a vote of 41 to 14. The

ratification of the treaty brought to a close the long drawn-out dispute as to territorial rights of possession.

Other minor questions relative principally to property claims remained to be adjusted, and later, questions as to the definite location of the water boundary through Georgia, Haro, and Juan de Fuca Straits became the subject of further negotiations and conventions; but this report is not directly concerned with them.

The text of the treaty is as follows:

THE OREGON TREATY. TREATY ESTABLISHING THE BOUNDARY IN THE TERRITORY ON THE NORTHWEST COAST OF AMERICA LYING WESTWARD OF THE ROCKY MOUNTAINS

*(Signed June 15, 1846; ratifications exchanged July 17, 1846)*

The United States of America and Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, deeming it to be desirable for the future welfare of both countries that the state of doubt and uncertainty which has hitherto prevailed respecting the sovereignty and government of the Territory on the northwest coast of America lying westward of the Rocky or Stony Mountains, should be finally terminated by an amicable compromise of the rights mutually asserted by the two Parties over the said Territory, have respectively named Plenipotentiaries to treat and agree concerning the terms of such settlement, that is to say: the President of the United States of America, has, on his part, furnished with Full Powers, James Buchanan, Secretary of State of the United States, and Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, has, on her part, appointed the Right Honorable Richard Pakenham, a Member of Her Majesty's most honorable Privy Council, and Her Majesty's Envoy Extraordinary and Minister Plenipotentiary to the United States; who, after having communicated to each other their respective full Powers found in good and due form have agreed upon and concluded the following articles:

ARTICLE I

From the point on the forty-ninth parallel of north latitude where the boundary laid down in existing treaties and conventions between the United States and Great Britain terminates, the line of boundary between the territories of the United States and those of Her Britannic Majesty shall be continued westward along the said forty-ninth parallel of north latitude to the middle of the channel which separates the continent from Vancouver's Island; and thence southerly through the middle of the said channel, and of Fuca's Straits to the Pacific Ocean; provided, however, that the navigation of the whole of the said channel and Straits south of the forty ninth parallel of north latitude remain free and open to both Parties.

ARTICLE II

From the point at which the forty-ninth parallel of north latitude shall be found to intersect the great northern branch of the Columbia River, the navigation of the said branch shall be free and open to the Hudson's Bay Company and to all British subjects trading with the same, to the point where the said branch meets the main stream of the Columbia, and thence down the said main stream to the Ocean, with free access into and through the said River or Rivers, it being understood that all the usual portages along the line thus described shall in like manner be free and open. In navigating the said River or Rivers, British subjects with their goods and produce, shall be treated on the same footing as citizens of the United States; it being however always understood that nothing in this article shall be construed as preventing, or intended to prevent, the Government of the United States from making any regulations respecting the navigation of the said river or rivers, not inconsistent with the present treaty

ARTICLE III

In the future appropriation of the territory, south of the forty-ninth parallel of north latitude, as provided in the first article of this Treaty, the possessory rights of the Hudson's Bay Company and of all British subjects who may be already in the occupation of land or other property, lawfully acquired within the said Territory, shall be respected



## ARTICLE IV

The farms, lands, and other property of every description belonging to the Puget's Sound Agricultural Company on the north side of the Columbia River, shall be confirmed to the said Company. In case however the situation of those farms and lands should be considered by the United States to be of public and political importance, and the United States' Government should signify a desire to obtain possession of the whole, or of any part thereof, the property so required shall be transferred to the said Government, at a proper valuation, to be agreed upon between the Parties.

## ARTICLE V

The present Treaty shall be ratified by the President of the United States, by and with the advice and consent of the Senate thereof, and by Her Britannic Majesty; and the ratifications shall be exchanged at London, at the expiration of six months from the date hereof, or sooner if possible.

In witness whereof, the respective Plenipotentiaries have signed the same, and have affixed thereto the seals of their arms.

Done at Washington the fifteenth day of June, in the year of our Lord one thousand eight hundred and forty-six.

[SEAL]  
[SEAL]

JAMES BUCHANAN  
RICHARD PAKENHAM

After the treaty of 1846 no further treaties or conventions pertaining to the boundary from the eastern shore of Georgia Strait to the Northwesternmost Point of Lake of the Woods were negotiated until 1908. The investigations, correspondence, concurrent action, and negotiations leading up to the treaty of 1908 are briefly treated in this appendix. The text of the treaty is given in the body of this report, pages 1 to 10.

The boundary as defined in the treaty of 1846 was laid down and marked upon the ground by a joint Commission in 1858 to 1862, as described in appendix III. Across the Cascade and Rocky Mountains, however, the boundary was not marked continuously, and in some instances the marks were long distances apart. In the course of time these marks became obscure and difficult to find, and meanwhile the settlement and development of the adjacent territory created demands for a more adequate marking than had originally been made.

As early as 1892 the Province of British Columbia called the attention of the Dominion Government to the necessity for a better definition of its southern boundary line to meet modern conditions, and in 1899 the attention of the Department of State of the United States was called to the fact that there were long intervals between monuments on the boundary west of the summit of the Rocky Mountains that had never been surveyed in any way. The discovery of minerals and the location of mineral claims in the border country led in 1900 to representations by the Province of British Columbia to the Dominion Government and by residents of the State of Washington to the United States Government, of the immediate necessity for a more thorough demarcation of the boundary on the ground. These representations were followed by correspondence between the two Governments which brought about an examination of the boundary line west of the summit of the Rocky Mountains by Canadian and United States engineers in 1901-2. The reports of these engineers to their Governments showed the reliability of the work done by the original Commissioners, that the locations of the original marks were recoverable, and that all that remained to be done in order to render the marking thoroughly effective for the requirements of the present and the future was the

replacement of the old monuments by more permanent ones and the interpolation of intermediate monuments at convenient points along the existent established boundary.

This required no new convention, and the two Governments promptly arrived at an understanding to the effect that they would concurrently undertake the work. Representatives, later recognized as commissioners, to carry on the work were nominated by the two Governments: Dr. O. H. Tittmann and Dr. C. D. Walcott by and for the United States, and Dr. W. F. King by and for His Britannic Majesty for Canada. The formal notices of the appointments of these representatives or commissioners are given in the text of this report, page 16. The final notes of the correspondence through which this understanding was reached are listed as follows:

Department of State of the United States; April 3, 1902 (No. 2410).

British Embassy, Lord Pauncefoot; April 7, 1902 (No. 95).

British Embassy, Arthur S. Raikes; August 9, 1902 (No. 200).

Department of State of the United States; August 12, 1902 (No. 2513).

Extract from the Privy Council of the Dominion of Canada; October 14, 1902.

British Embassy, Michael H. Herbert; October 23, 1902 (No. 264).

These notes are to be found in the departmental files at Washington and Ottawa.

The work of resurveying and remonumenting this section of the boundary was carried out through concurrent action by these Commissioners during the years 1903 to 1908. During this period the need for more effectively marking the entire boundary from the Atlantic to the Pacific Ocean, which had already been recognized, became increasingly apparent to the two Governments, and negotiations were carried on which resulted in the adoption of the treaty of April 11, 1908,<sup>3</sup> providing for "the more complete definition and demarcation of the international boundary between the United States and the Dominion of Canada."

The joint surveys carried on under the provisions of the treaty of 1908 along this and other sections of the boundary revealed the need for the clarification of several questions regarding the boundary and the need for continuous maintenance to keep the markings effective. The discussion of these needs led up to the treaty of February 24, 1925, the text of which is given on page 11.

For a more detailed account of the negotiations leading up to the treaties discussed in the foregoing paragraphs the reader is referred to "History and Digest of the International Arbitrations to which the United States has been a Party", vol. I, by John Bassett Moore; and the notes of Chandler P. Anderson on the "Northern Boundary of the United States", which have been closely followed herein but abbreviated. Other references are noted in the publications just mentioned.

<sup>3</sup> For text of treaty, see p. 1.

### APPENDIX III

#### ORIGINAL SURVEYS AND DEMARCATION

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##### BOUNDARY WEST OF THE SUMMIT OF THE ROCKY MOUNTAINS

After the adoption of the boundary west of the Rocky Mountains by the treaty of 1846, almost exactly ten years elapsed before any steps were taken to survey and mark the line upon the ground. In the meantime, the Territory of Oregon was organized by an act of Congress on August 4, 1848, and the Territory of Washington was organized from the northern portion of the Oregon Territory by an act of Congress on March 2, 1853. In 1849 Vancouver Island was constituted a British Colony. In 1855 gold was discovered on the Columbia River at the mouth of the Pend-d'Oreille (Clark Fork) near the 49th parallel. The country on both sides of the border was rapidly being settled and it became increasingly urgent that the boundary line should be located on the ground and marked.

In 1856 Congress passed an act, approved August 11, to provide for the demarcation of the boundary between Washington Territory and the possessions of Great Britain in accordance with the provisions of article I of the treaty of 1846. At that time the Territory of Washington extended along the 49th parallel eastward to the summit of the Rocky Mountains. The act of Congress carried an appropriation for the work and provided for a Commissioner, a chief astronomer, and a surveyor on the part of the United States to unite and act with similar officers to be appointed by Her Britannic Majesty, to survey and monument the boundary.

The Commission was promptly organized on the part of the United States and on February 14, 1857, Archibald Campbell was appointed Commissioner, which position he held until the completion of the work in 1869.

Great Britain assented to the proposal for a joint commission and appointed Capt. James Charles Prevost, R. N., as first Commissioner, and Capt. George Henry Richards, R. N., as second Commissioner with powers to act as Commissioner only in the event of the death of Captain Prevost.

Commissioners Campbell and Prevost held their first meeting on June 27, 1857, on board H. M. S. *Satellite*, Captain Prevost's ship, in Esquimalt Harbor. The respective commissions of all the officials were exhibited, read, and found in due form. Captain Prevost's commission, however, did not extend to the whole line, his instructions reading, "so much of the boundary between Her Majesty's possessions in North America and the territories of the United States as is comprised between the continent of America and Vancouver's Island."

A second meeting of the Commissioners was held three weeks later, but as the second British Commissioner, Captain Richards, who was to act as chief astronomer, had not yet arrived, it was decided that nothing could be done at the time in regard to the water boundary.

Accordingly, the United States Commissioner turned his attention to the land boundary. He began operations with his party on the 49th parallel at Point Roberts on the eastern shore of Georgia Strait, and carried on work independently during the remainder of the year 1857 and the spring of 1858. His further relations with Captain Prevost concerning the water boundary terminated in disagreement and consequently in failure to establish that boundary. (See report—International Boundary Commission—Forty-ninth Parallel to the Pacific Ocean; 1921.)

On February 3, 1858, Capt. John Summerfield Hawkins, Royal Engineers, was appointed Commissioner by Queen Victoria "for the purpose of ascertaining and marking out, in conjunction with a Commissioner on the part of the United States of America, the line of Boundary under the Treaty between Gr. Britain and the United States of the 15th of June, 1846, from the point where the Boundary laid down in previously existing Treaties and Conventions terminates to the point at which the 49th parallel of North Latitude strikes the eastern shore of the Channel which separates the continent from Vancouver's Island." Captain Hawkins reached Esquimalt, Vancouver Island, about the middle of June 1858. Soon thereafter he began work in conjunction with the United States parties already in the field.

The survey and demarcation executed by Commissioners Campbell and Hawkins extended from the western shore of Point Roberts on Georgia Strait to the summit (crest of the watershed) of the Rocky Mountains. The commission of Mr. Campbell was limited to the boundary between Washington Territory and the possessions of Great Britain. The summit of the Rocky Mountains was the eastern limit of Washington Territory. The commission of Captain Hawkins, as just noted was "from the point where the Boundary laid down in previously existing Treaties and Conventions terminates to the point"—etc. The instructions issued to Captain Hawkins by his Government refer to this point in the following language: "\* \* \* and all that you will have to do will be to continue to mark out the line along that parallel till it reaches the point 'where the boundary laid down in existing Treaties and Conventions between Great Britain and the United States terminates.' That point is as you will see by the second article of the Treaty of October 20, 1818, herewith transmitted to you, the 'Stony' or 'Rocky' Mountains; and it would seem from the wording of that article that the point is to be found on the eastern base of those mountains."

It will be readily seen that joint operations could not be carried farther east than the summit of the Rocky Mountains. Near the conclusion of the work Commissioner Hawkins in writing to his Secretary of State for Foreign Affairs, under date of December 31, 1861, says in regard to this terminus of the work:

In concluding this subject, I have to observe that when terminating the labours of the Commission on the Crest or Watershed of the Rocky Mountains, I did not overlook that my original instructions in despatch No. 2 of the 30th March 1858 informed that from the wording of the second article of the treaty of October 20th, 1818, it would seem that the point "where the Boundary laid down in existing treaties and conventions between Great Britain and the United States terminates" is to be found on the eastern *base* of the mountains. I learned however from the instructions of the U. S. Commissioner that the Act of Congress of the 11th August 1856 under which he was appointed limited the proceedings of the U. S. Commission to the demarcation of the line of Boundary "which forms the Boundary line between Washington Territory and the British Possessions" and Mr Campbell gave me to understand that the northern boundary of

Washington Territory ended on the crest of the Rocky Mountains. I considered, therefore, that any work performed by the British Commission beyond that point would have no *joint* official character; and apart from the serious loss of time which must have been incurred in executing it, a joint agreement as to the point at the base of the Mountains at which the Boundary under the Convention of 20th October, 1818, might be assumed to terminate would have been necessary, into Which the U. S. Commissioner was not prepared to enter.

Since the termination of the survey by Commissioners Campbell and Hawkins at the summit of the Rocky Mountains, the summit has been quite uniformly used to designate the dividing point between the sections of the boundary lying east and lying west of the Rocky Mountains.

The available records of the joint survey made under Commissioners Campbell and Hawkins are not as complete as might be desired. We find that after the field work was completed, Commissioner Campbell had a manuscript report of the work prepared and submitted it to the Department of State in Washington. This report was not published, and the manuscript has been lost from view for many years. When the Northern Boundary Commission was created, in 1872, Archibald Campbell was appointed United States Commissioner for that boundary survey. At the outset of that work he found it desirable to consult the records of the "Northwestern Boundary Survey" upon which he had previously been engaged. Accordingly he wrote the following letter, which is now on file in the Department of State in Washington:

U. S. NORTHERN BOUNDARY COMMISSION  
*Washington, D. C., June 27, 1872.*

SIR:

In preparing for the duties of the boundary commission it would be of the greatest assistance to have the use of the records, notebooks, and other papers of the Northwest Boundary Commission, deposited by me in the Department at the close of the work in October, 1869.

I have therefore the honor to request that you allow me to withdraw these records and papers temporarily. Before leaving for the field they will be returned to the Department.

I have the honor to be, very respectfully, your obedient servant,

ARCHIBALD CAMPBELL,  
*Commissioner, Northern Boundary Survey.*

Hon. CHAS. HALE,  
*Acting Secretary of State.*

This letter is endorsed: "Papers, etc., herein referred to sent to Mr. Campbell 27th June." The most diligent search and inquiry has failed to find further trace of the report.

There are, however, manuscript records, memoranda, notes, correspondence, maps, etc., of the survey in the possession of the Department of State at Washington from which much information regarding the progress and the methods of the survey can be drawn.

These records and maps are described in considerable detail in the history of the establishment, survey, and marking of this portion of the boundary, with a summary of results, prepared by Marcus Baker of the United States Geological Survey in the year 1900, from an examination of the available records "memoranda, notes, sketches, pictures, correspondence, and the memories of men still living", and published as Bulletin No. 174 of the United States Geological Survey, under the title of "Survey of the Northwestern Boundary of the United States, 1857-1861."

By a strange coincidence, the British records of the survey were also lost from view for many years. When questions began to arise as to the markings of the

boundary upon the ground, about 1890 and later, diligent search was made in London for the records, but without avail. In 1898, Dr. Otto Klotz, Astronomer for the Dominion Government, discovered the missing records, quite by accident, at the Royal Observatory at Greenwich. He states:

Such was the situation [referring to the loss of the records] when the writer was sent by the Dominion Government to London and Petrograd on a special mission, in which was included the obtaining of information regarding the records and final report of the survey. All of the Government offices in London were visited in which there was the faintest likelihood that the records might be stored, but all to no avail, and no one seemed to be able to give any assistance. Before leaving England, however, the writer, as Astronomer for the Dominion Government, naturally paid a visit to the Royal Observatory at Greenwich. By chance his eye caught the initials B. N. A. on some boxes on the top of the library shelves—letters at once interpreted as possibly standing for British North America. The boxes were taken down, the dust of years removed, and in them lay the long-lost records of the international survey of the forty-ninth parallel.<sup>1</sup>

The British records descriptive of the survey are now to be found in the British "Foreign Office Correspondence" and, in addition to the jointly signed final report, consist principally of the letters and periodic reports of Captain Hawkins to his Government.

The boundary as laid down from the surveys of the Joint Commission is shown on seven maps and an index map. These maps are dated May 7, 1869, and are signed by the Commissioners and surveyors of the respective Governments. One duplicate original set of maps is on file in the Department of State in Washington. The original signed set is deposited with the British Government.

This set of maps was adopted on behalf of the two Governments by Sir Edward Thornton, the British Minister at Washington, and Hamilton Fish, Secretary of State, on February 24, 1870, by joining in the following written declaration:

#### ADOPTION OF OFFICIAL MAPS

DECLARATION APPROVING AND ADOPTING THE MAPS PREPARED BY THE JOINT COMMISSION OF THE NORTHWEST BOUNDARY FOR SURVEYING AND MARKING THE BOUNDARIES BETWEEN THE BRITISH POSSESSIONS AND THE UNITED STATES ALONG THE 49TH PARALLEL OF NORTH LATITUDE, UNDER THE FIRST ARTICLE OF THE TREATY OF 15TH JUNE, 1846

*Signed at Washington February 24th, 1870*

The undersigned Hamilton Fish, Secretary of State of the United States, and Edward Thornton, Esquire, Her Britannic Majesty's Envoy Extraordinary and Minister Plenipotentiary to the United States, duly authorized by their respective Governments, having met together:

The set of maps, seven in number, which have been prepared by the Commissioners appointed by the two Powers to survey and mark out the Boundary between their respective Territories under the first article of the Treaty concluded between them at Washington on the 15th of June, 1846, having been produced;

And it appearing that they do correctly indicate the said Boundary from the point where the Boundary laid down in Treaties and Conventions prior to June 15th, 1846, terminates Westward on the 49th Parallel of North Latitude to the Eastern shore of the Gulf of Georgia, which Boundary has been defined by the Commissioners by marks upon the ground;

The Undersigned, without prejudice to the rights of their respective Governments as to the settlement and the determination of the remainder of the said Boundary, hereby declare that the said maps certified and authenticated under the signatures of Archibald Campbell, Esquire, the Commissioner of the United States, and of Colonel John Summerfield Hawkins, Her Britannic Majesty's Commissioner, and of which duplicate copies similarly certified and authenticated

<sup>1</sup> The History of the Forty-ninth Parallel Survey West of the Rocky Mountains, by Otto Klotz. The Geographic Review, vol. III, no. 5 (May 1917).

are in the possession of the Government of Her Britannic Majesty have been duly examined and considered, and, as well as the marks by which the Boundary to the Eastern shore of the Gulf of Georgia has been defined upon the ground, are approved, agreed to, and adopted by both Governments.

In witness whereof the respective Plenipotentiaries have signed the same and have affixed thereto their respective seals.

Done at Washington the twenty-fourth day of February, in the year of our Lord, one thousand eight hundred and seventy.

[SEAL]

HAMILTON FISH

[SEAL]

EDWD. THORNTON

From the records thus briefly described, the procedure and results of the survey have been abstracted with sufficient detail to permit of a faithful retracement of the entire boundary as ascertained, laid down, and marked by the original Commission.

An outline of the procedure and results of the survey to acquaint the reader with the basic facts upon which the resurvey and demarcation described in this report is dependent seems here in order.

#### CONFERENCES AND AGREEMENTS OF THE COMMISSIONERS OF 1857-1869

The first meeting of the Joint Commission for determining and marking the land boundary west of the Rocky Mountains was held at the United States Boundary Commission camp at Semiahmoo, August 13, 1858. At this meeting the credentials of the Commissioners were examined and found satisfactory, and certain agreements were entered into regarding the methods of carrying on the proposed work. These agreements as quoted from the British Foreign Office records are as follows:

The Commissioners agreed that that part of the Boundary should be first determined which lies between the point where the 49th parallel of North Latitude strikes the shore of Semiahmoo Bay, and the Cascade Mountains, and that such determination of the Boundary be commenced at the point fixed by Capt. G. H. Richards, R. N. the British second Commissioner for the determination of the Water Boundary—under the Treaty of June 15th 1846 and Lieutenant J. G. Parke, United States Topographical Engineers and Chief Astronomer, on the shore of Semiahmoo Bay.

After discussing plans for determining and marking the line, as far eastward as the Cascade Mountains, it was concluded to be inexpedient at the present time in consequence of the great expense, consumption of time, and the impracticable nature of the Country, to mark the whole Boundary by cutting a track through the dense forest. It was therefore agreed to ascertain points on the line by the determination of astronomical points at convenient intervals on or near the Boundary; and to mark such Astronomical Stations or points fixed on the Parallel forming the Boundary, by cutting a track of not less than 20 feet in width on each side for the distance of half a mile or more according to circumstances. Further that the Boundary be determined and similarly marked where it crosses streams of any size, permanent trails, or any striking natural features of the Country. In the vicinity of settlements on or near the line, it is deemed advisable to cut the track for a greater distance, and to mark it in a manner to be determined hereafter.

These agreements are signed by both Commissioners.

The second meeting of the Joint Commission was held at Semiahmoo, April 16 to 23, 1859. The minutes of this meeting record that plans for joint operations were fully discussed and that various proposals were submitted by each Commissioner, but there was a failure of agreement in all but two of the items. The United States Commissioner refused to sign the minutes. The drafted minutes so far as they relate to discussions and agreements read as follows:

1. Plans for the prosecution of the joint operations of the Commission during the present season were fully discussed.

2. The British Commission proposed that the arrangement, recorded in the Protocol, signed on the 14th August, 1858, that it being "inexpedient at the present time in consequence of the great expense, consumption of time, and the impracticable nature of the Country to mark the whole Boundary by cutting a track through the dense forest. It was therefore agreed to ascertain points on the line by the determination of astronomical points at convenient intervals, on or near the Boundary—and to mark such Astronomical stations, or points fixed on the parallel forming the Boundary, by cutting a track of not less than twenty feet in width on each side for the distance of half a mile or more according to circumstances," be revised. He proposed that in accessible forest land cuttings of the width of 20 feet or thereabouts be made throughout, and the Parallel laid out and marked at intervals of about one mile by suitable Monuments; the Boundary line being admitted to lie evenly between such marked points, as in such limited distance the curve of the Parallel would be practicably inappreciable: and that in rugged or mountainous districts through which portions of the Boundary may run, and which are physically inaccessible, or impenetrable, or which are practically so to the extent of making their beneficial occupation improbable and the labour and expense of minutely marking the Boundary therein consequently unnecessary; as many prominent or accessible points as may be possible or necessary, be determined by survey between the adjacent Astronomical stations and marked by beacons, cairns, or lasting monuments of some suitable description.

3. The United States Commissioner seeing no good reason to change the conclusion arrived at by the joint Commission on the 13th August, 1858 that it is "inexpedient at the present time in consequence of the great expense, consumption of time, and the impracticable nature of the Country to mark the whole Boundary, by cutting a track through the dense forest" and considering the remainder of the proposition of the British Commissioner as already met by the agreement of the joint Commission to determine and mark out the Boundary "where it crosses streams of any size, permanent trails, or any striking natural features of the country," declined to adopt the proposition.

4. The British Commissioner announced his intention to proceed with the demarcation of the Boundary, between Semiahmoo Bay and the Cascade Mountains, in the manner above proposed by him, to such an extent as circumstances would permit; as delay in doing so might involve the loss of the present season for such purpose, and the inconvenient postponement of the work in view of the probable removal of the two Commissions from this part of the Country; and as this portion of the operations would thus be undertaken solely by the British Commission, that he should report his proceedings to the British Government for their further instructions in such cases.

5. The British Commissioner subsequently requested the United States Commissioner to continue the cutting of the Boundary from Semiahmoo Bay, which had been commenced by his parties, to some further distance inland in extension of the arrangement recorded in the Protocol of the 14th August 1858 "To cut the track for a greater distance in the vicinity of settlements on or near the line," so as to meet the proposed cutting of the British Commission proceeding westward from Sumass; which point the United States Commissioner reserved for further consideration.

6. A proposition made by the British Commissioner respecting the nature and provision of suitable monuments for marking and preserving the Boundary in all accessible portions of it, was not fully discussed, and no decision upon it was arrived at, in consequence of the United States Commissioner having declined to proceed with the demarcation of the Boundary line throughout. To a further suggestion by the British Commissioner, that he should be authorized to procure at the expense of the joint Commission a sufficient number of iron monuments to define the portion of Boundary he had announced his intention of marking out this season, the United States Commissioner declined to accede.

7. The Commissions agreed that the determination of such astronomical points on or near the Boundary as are still required to complete the series between Semiahmoo and the western slopes of the Cascade Mountains at Chilukweyuk be undertaken by the British Commission; and that the determination of astronomical points at convenient intervals in continuation of the series eastward from Chilukweyuk towards the Columbia River be continued by both Commissions. It was also agreed that the principle on which points be taken up by the astronomical parties of the two Commissions be that of occupying them alternately, subject to such modifications by the executive officers as may be mutually agreed upon by them.

8. The elements assumed for the figure of the Earth (Bessel's) and the nature of the computations for the length of the ordinates for connecting tangents with the parallel were agreed upon.

9. The British Commissioner proposed the consideration of the astronomical results at such points as have already been observed by the two Commissions, with a view to their being finally adopted if found to be satisfactory.



10. The United States Commissioner proposed, before the adoption of those points, that the joint Commission adopt the three following points on the 49th Parallel, viz: 1st. The point where the Parallel intersects the Continent on the Western face of Point Roberts; 2nd. The point where the Parallel intersects the eastern face of Point Roberts; 3rd. The point where the Parallel intersects the eastern shore of Semiahmoo Bay.

11. The British Commissioner declined entering upon the present consideration of the portion of the Boundary, between the eastern shore of Semiahmoo Bay and the western face of Point Roberts, in view of the circumstances which occurred between the British Water Boundary and the United States Commissioners prior to this question having been brought under his notice. He further stated that the points in question are most satisfactorily determined by astronomical operations, and that the postponement of their final adoption ought to have no effect on the course of proceedings eastward of Semiahmoo.

12. While circumstances exist which prevent the British Commissioner adopting these points, the United States Commissioner declined to adopt the points submitted for consideration by the British Commissioner.

Consequent upon failure to reach full accord at this conference, each Commissioner carried on work more or less independently during the interval between this and the next conference.

The third conference was held at Harney Depot, Washington Territory, on November 6 to 8, 1860. The items of discussion and agreement recorded in the minutes of this meeting are as follows:

1. The operations of the British and United States Commissions from the western terminus of the Land Boundary at Point Roberts to the eastern terminus at the summit of the Rocky Mountains were mutually explained; and the future course of operations in the field was discussed.

2. The Commissioners agreed that the portion of the Boundary extending from the western terminus at Point Roberts to the western slope of the Cascade Mountains be marked by iron monuments at suitable intervals. That the portion extending from the crossing of the Boundary at the Similkameen river eastward towards the Columbia river be marked by stone beacons, exclusive of the intervals which from their rugged and mountainous nature may render such minute marking of the Boundary unnecessary. That the portion of accessible ground in the valley at the eastern crossing of the Kootenay River be also marked by stone beacons—and that the space between the Kishenehu and Flathead Rivers be marked in a similar manner.

The Commissioners agreed that the points on the Boundary ascertained by the two Commissions by the determination of astronomical points at convenient intervals be acknowledged; subject to the future mutual examination of the astronomical observations and of their results, on the final completion of the field operations.

We find no record of other formal joint conferences of the Commissioners held during their field operations. There are, however, records of informal conferences between the officers of the two sections of the Commission regarding details of the work, and in the end, the separate and independent operations of the two sections were mutually accepted by the Commissioners.

The field work of the United States parties seems to have been completed some time during the season of 1861, that of the British section sometime early in 1862; the exact dates do not appear. After the close of field work the British Commissioner returned to London and maintained offices there until the completion of the necessary office work. Likewise the United States Commissioner maintained an office in Washington.

During the time the office work was being completed there appear to have been no joint meetings of the Commission. The chief astronomer to the British Commissioner, Capt. R. W. Haig, however, spent some time with the United States Commission in Washington in the latter part of 1862, and about four months again in 1863, conferring in regard to the drawing of the final joint maps of the survey.

The fourth and final joint conference of the Commissioners was held in Washington, May 4 to 7, 1869. At this meeting the work of the Joint Commission was brought to a close.

The text of the minutes of this meeting as submitted by Colonel Hawkins to his Government are here given in full:

WASHINGTON, D. C., 1869.

Meetings of the Commission on the part of Great Britain to ascertain and mark out so much of the line of Boundary between the British Possessions and the United States described in the First Article of the Treaty between Her Britannic Majesty and the United States of America dated 15th June 1846 as lies between the Rocky or Stony Mountains and the Eastern shore of the Channel which separates the Continent of North America from Vancouver's Island, and the Commission on the part of the United States to carry into effect the first Article of the Treaty aforesaid, held at the office of the United States Boundary Commission, Washington, District of Columbia, U. S. on the 4th, 5th, 6th, and 7th May 1869.

Present:

John Summerfield Hawkins, Colonel Rl. Engrs. Her Majesty's Commissioner for ascertaining and marking out the line of Boundary from the point on the Forty-ninth Parallel of North Latitude where the Boundary laid down in existing Treaties and Conventions between Great Britain and the United States terminates, to the point at which the Forty-ninth Parallel of North Latitude strikes the eastern shore of the Channel which separates the Continent from Vancouver's Island.

Samuel Anderson, Lieut: Royal Engineers, Secretary to the British Commission.

Archibald Campbell, Commissioner on the part of the United States to carry into effect the first Article of the Treaty of the 15th June 1846 between the United States and Great Britain.

John G. Parke, Major U. S. Engineers and Brevet Major General U. S. A.—Chief Astronomer and Surveyor on the part of the United States to carry into effect the first Article of the Treaty as aforesaid.

William J. Warren—Secretary to the United States Commission.

Robert Wolseley Haig, Captain Royal Artillery, Chief Astronomer to the British Commission—was unable to attend the meetings of the joint Commission on account of serious illness.

1. The astronomical and geodetical determinations of the several astronomical stations, and of the points on the Forty-ninth Parallel of North Latitude by which the Boundary has been defined between its western terminus at Point Roberts in West Longitude  $123^{\circ}3'53''$  and its eastern terminus on the watershed of the Rocky Mountains in west longitude  $114^{\circ}3'28''$  agreed upon and exchanged in May 1863 between Captain R. W. Haig, R. A. Chief Astronomer of the British Commission and G. Clinton Gardner, Assistant Astronomer and Surveyor to the United States Commission having been carefully compared and corrected are finally adopted; and lists of them are countersigned (2) and hereunto attached.

2. The two sets of seven Maps prepared severally by the respective Commissions upon the above named data on a scale of 1:120,000 having been carefully compared and countersigned, are hereby declared to represent so much of the Boundary described in the First Article of the Treaty between Her Britannic Majesty and the United States of America dated 15th June 1846 as is comprised between the intersection of the watershed of the Rocky Mountains by the Forty-ninth Parallel of North Latitude in west longitude  $114^{\circ}3'28''$  and the point at which the 49th parallel of north latitude strikes the Eastern shore of the Channel which separates the Continent from Vancouver's Island in West Longitude  $123^{\circ}3'53''$ .

3. It is agreed by the Commissioners that, between any two successive defined points, marked on the ground shown on the maps, and set forth in the accompanying lists, the line of Boundary above described is to be understood to be a right or straight line; and that this rule is to apply throughout the entire Boundary without regard to the distances between the consecutive points or to the course of the parallel in such intervals.

J. S. HAWKINS,  
Colonel Rl. Engrs.,  
H. B. M. Commissioner,  
7th May, 1869.

ARCHIBALD CAMPBELL,  
U. S. Commissioner,  
&c. &c. &c.  
May 7th, 1869.

## FINAL REPORT OF THE BRITISH COMMISSIONER

Immediately following the Washington conference of the Commissioners, of May 7, 1869, Colonel Hawkins made a brief final report to his Government in which he recapitulated the work of the Commission. He accompanied the report with copies of the minutes of the conferences of the Commissioners (which have already been quoted herein) and the two tables of geodetic coordinates which had been agreed to and signed by himself and Commissioner Campbell. The full text<sup>2</sup> of the report followed by the two signed tables is here given:

H. M. BOUNDARY COMMISSION,  
WASHINGTON, U. S.  
10th May, 1869.

MY LORD,—In compliance with your instructions conveyed to me by Mr. Hammond on the 22nd February, I left Barbados on the 9th and arrived at New York on the 21st April. Lieut: S. Anderson, R. E., Secretary to the Boundary Commission, arrived on the same night and joined me on the following morning. We proceeded to Washington on the 23rd April; and having reported our arrival to Her Majesty's Minister on the morning of the 24th, I put myself into immediate communication with Mr. A. Campbell, the United States Commissioner.

2. I have now the honor to inform your Lordship that on the afternoon of the 7th instant our labours were brought to a conclusion, which will I hope be quite satisfactory to you and Her Majesty's Government, and meet with the Approval of Her Majesty. Several days were occupied in the careful comparison of the astronomical determinations, and of the Maps, &c., and formal meetings of the joint Commission were held on 4th, 5th, 6th and 7th May. A protocol authenticating the points by which the land Boundary has been defined upon the ground, and the maps severally prepared by the two Commissions was agreed upon; and it and the maps were countersigned by Mr. Campbell and myself on the 7th instant. The protocol is herewith enclosed, with the two lists of astronomical determinations alluded to in its first clause; together with the originals of the two protocols adopted on the 14th August, 1858, and 8th November, 1860, Copies of which were sent to the Foreign Office with my letters, Nos. 3 and 14 dated 28th March, 1859, and 28th March, 1861, and of the minutes of the proceedings of the joint Commission in April 1859 on which occasion no agreement was arrived at as reported in my letter No: 6 of the 31st May 1859. The maps require some trifling corrections of detail and the addition of some names common to the two sets; and upon their completion I have desired Lieut: Anderson to convey them to the Foreign Office, to be disposed of as your Lordship may see fit to direct.

3. The detailed reports made by me during the progress of the work contain minute information both as to our operations and the nature of the country traversed by the Land Boundary; but upon reporting the execution of so much of the Treaty of the 15th June, 1846, as was comprised in my Commission it may be as well to recapitulate in brief terms the nature and results of those operations.

4. Between the extreme east and west points, upon the watershed of the Rocky Mountains and the eastern shore of the Channel which separates the Continent of North America from Vancouver's Island in West Longitude  $114^{\circ}3'34''$  and  $123^{\circ}3'53''$ , the exact length of the Boundary upon the 49th Parallel of North Latitude is  $409\frac{1}{10}$  miles. The position of the Parallel was determined from 28 astronomical stations, 11 of which were established by the British Commission, 14 by the American Commission and 3 were observed from by both. Another station was fixed by the British Commission, at Schweltza Lake, but it was rejected for the reasons given in paragraphs 11 and 16 of my Report No: 9 of the 21st May 1860 and again referred to in letter No: 24 dated 31st December 1861 though our after experience of the most accurate instrumental observations in that mountainous country now leads to the conclusion that the result at Schweltza was quite as trustworthy as any of the others. It is however not included in our final determinations. I believe the observations of the two Commissions to have been made with the utmost attainable precision, which is most conclusively shown by the computations; but upon connecting 5 of the stations by the demarcation of a continuous line of Boundary in the 60 miles between Similkameen and Statapoosten stations, we were greatly disappointed by the discovery of

<sup>2</sup> The quotations from Foreign Office Correspondence, including the report of Colonel Hawkins and the signed tables here referred to, follow the text of the Canadian Department of the Interior's publication entitled "Certain Correspondence of the Foreign Office and of the Hudson's Bay Company, Copied from Original Documents, London, 1898", Government Printing Bureau, Ottawa, 1899.

somewhat large discrepancies between *all* the determinations of the accuracy of which we had previously been quite satisfied, and which can only be attributed to prevading [sic] physical causes affecting the Instrumental observations which were quite beyond our control. By agreement these discrepancies were adjusted by the U. S. Commission, by the verification of the work of the British Commission and the adoption of a mean parallel between the determinations alluded to which probably approximates very nearly to the true 49th parallel; but as this test was not practicable in any other cases, the astronomical determinations have in them been necessarily adhered to.

5. The actual demarcation was affected [sic] as follows:—The western extremity of the Boundary is marked by a substantial Granite obelisk in West Longitude  $123^{\circ}3'53''$ , which stands upon a steep cliff on the western face of the promontory [sic] of Point Roberts, about 160 feet above the sea. The several faces of the obelisk are inscribed as follows—on the north face with the names of Her Majesty's water and Land Boundary Commissioners, Capt. J. C. Prevost and G. H. Richards, R. N., and Lieut. Colonel J. S. Hawkins, R. E., on the South face with the name of the American Commissioner Archibald Campbell,—on the West face with the designation and date of the Treaty, viz: Treaty of Washington, 15th June, 1846,—and on the east face with the Latitude and Longitude, and the year of erection, viz: Latitude  $49^{\circ}0'0''$  N., Longitude  $123^{\circ}3'53''$  W, Erected 1861. For  $44\frac{1}{2}$  miles eastward there are 42 iron pillars placed at points on the Boundary which the officer to whom the duty was entrusted thought most suitable and convenient. One pillar stands on the eastern face of Point Roberts, 2 miles 704 yards from the obelisk, and there are two intermediate pillars in the interval at average distances apart of somewhat more than  $\frac{1}{4}$  mile. A pillar on the west shore of Semiahmoo Bay is 12 m:1177 yards: from that on Point Roberts on the opposite side of the Bay; and thence in  $29\frac{1}{4}$  miles to the easternmost pillar the average distance apart is about 1380 yds. varying between one mile 1245 yds., and 198 yds., on the opposite banks of the Sumass River. These pillars all stand in a continuous cutting through the forest or in intervening patches of swamp and Prairie. From the easternmost iron pillar to the right or west bank of the Similkameen River, in  $107\frac{1}{2}$  miles, the Boundary is defined in the vicinity of 9 astronomical stations by 19 cairns or pyramids built of dry stones as carefully as the materials and circumstances would permit, and one bench-mark cut on the face of a rock (at Ensakwatch); and at several stations short vistas were also cut in the forest, between the cairns. This wide interval comprises the rugged and inhospitable region of the Cascade Mountains in which it would only have been possible to mark the Boundary line more continuously by an expenditure of time and money out of all proportion to the object in view. One of the widest unmarked intervals on the Boundary occurs in these Mountains, between Pasayten and Naisnulo, the distance between the marked points being  $23\frac{1}{2}$  miles; and this might have been obviated by placing a station on the main or western branch of the Naisnulo River which however would have prolonged the work of the British Commission by another Season.—

From a cairn at the foot of the Mountains on the West side of the Similkameen River to the east or left bank of the Columbia, the Boundary for 95 miles is well and continuously marked by 69 stone cairns and one mound of earth, and by forest cuttings in all necessary cases. This was the most favourable portion of the work part of the line passing over rolling prairie country interspersed with wood; but very considerable portions were also mountainous, rugged and heavily timbered, though more accessible from the valley of the Newhoialpitkwn River than were the Cascade Mountains. Two cairns stand within 129 yards of each other on the east bank of the Columbia River (one having been placed by each Commission) and the average distance apart of the remainder is 1 mile 679 yards. From the hill tops the line of Boundary defined by the cairns and cuttings can be traced for many miles.

For the remaining  $161\frac{1}{2}$  miles between the eastern cairn on the left bank of the Columbia River and the terminal point on the watershed of the Rocky Mountains in West Longitude  $114^{\circ}3'28''$ , the Boundary passes over successive Mountain ranges intersected only by the Valley of the Kootenay River at two points  $75\frac{1}{2}$  miles apart, and by the adjacent valleys of the Flathead River and its tributary Kishenehu Creek, by which alone, the 49th parallel is practically accessible though even then by long circuitous routes. This portion of the line is marked in the vicinity of 9 astronomical stations, by 26 cairns and one bench-mark cut in the face of a rock at the Kootenay Mtn. Station, and by a cairn fixed by survey on the trail between Kootenay West and Mooyie Stations; and the usual forest vistas were cut at the several defined points, besides longer cuttings of 10 and 7 miles at the eastern crossing of the Kootenay, and between the Flathead and Kishenehu Rivers. No better means for marking the eastern end of the Boundary were at command than by a dry stone pyramid of the usual description which was built as carefully as possible, and which may be preserved for many years by its protected situation on a narrow saddle with precipitous sides connecting two lofty mountains, which position will moreover serve to identify the approximate locality of the Boundary at any future time.

Between the Columbia and the Rocky Mountains, exclusive of the Mooyie trail cairn, and the intervals between Kootenay Mountain and Kootenay West stations and Mooyie and Yahk stations, the distances between the consecutively marked points at the several astronomical stations average about  $13\frac{1}{4}$  miles; but between the stations named they extend to 25 and 24 miles owing to the inaccessible nature of the intervening country which is quite as bad as the Cascade Mountains.

6. Having thus described the manner in which the Land Boundary has been marked from end to end, I respectfully request your Lordship's consideration of the 3rd Article of the closing protocol by which the Commissioners agreed to understand the Boundary laid out by them to consist of a series of straight lines between the successively marked points, without regard to the distances between those points or the curve of the parallel in the longer intervals. We were induced to do this upon the consideration that it was of the greatest importance, nothing should be left for *future* discussion or settlement, and that our operations should be final and conclusive. Even had the Boundary line been continuously marked throughout by defined points at say a mile apart, the actual parallel would have been departed from by the straight lines or chords joining such lines upon it; and owing to the insuperable difficulties attending a more minute demarcation in the rugged country traversed by us, we have been compelled to adopt a more irregular and longer sided polygon than we should have wished. I may state that opposite the centre of a chord of 25 miles in length the departure from the 49th parallel would be about 40 yards, and of 12 miles 9 yards, which in such country and under present circumstances is of no appreciable value, and this even would be materially affected by the very great uncertainty attending the precision of the astronomical results previously alluded to; so that I hope our definite action in the matter will be fully approved. The points being identified, they can be joined at any time with no greater difficulty than attends the running of a straight line between two *fixed* points over a rough country and sometimes for a considerable distance, but no scientific question would be involved in the operation which could be performed by any careful surveyor.

7. The above remarks lead me to request your Lordship's further consideration of the necessity of entering into a convention with the United States, supplementary to the Treaty of the 15th June 1846, declaratory of the Boundary marked out by the joint Commission being the Boundary of the Treaty notwithstanding any possible departures from the actual line of the Forty-ninth Parallel. The more than probability that such departures unavoidably exist is alluded to above, and in previous reports; and the necessity for a supplementary Convention was suggested by me in the concluding paragraph of my letter No: 28 of the 4th August 1862, and recognized by Her Majesty's Government in a letter from the Treasury to Mr. Hammond dated 26th September 1862.

8. In conclusion, I have only to repeat previous recommendations that some *certain* steps should be taken to preserve the Boundary marks laid down at such large cost of time, labour and money. This cannot of course be done without some occasional and special expenditure for the purpose, as it ought not to be left to accidental opportunities; but it is very probable that the country which was almost inaccessible in 1858-62 is now more or less traversed along the greater part of the frontier line; and the labour of a few Woodsmen under the supervision of the Colonial Survey Department, for the maintenance of the stone cairns, and the preservation of the forest cuttings, would not be very costly. In the more accessible parts as opportunities offer, it would be very desirable to substitute permanent monuments of some simple character for the dry stone pyramids and I presume this could be done by concert with the public authorities in the adjoining United States territories. The obelisk at Point Roberts should be also duly maintained, and the iron pillars on the western section of the line occasionally painted. By these simple means the permanence of the Boundary would be ensured. Trusting that my proceedings will meet with your approbation, I have the honour to be

Your Lordship's most obedient humble servant

J. S. HAWKINS,  
Colonel Rl. Engrs.  
H. M. Commissioner.

The Right Honble.

The SECRETARY OF STATE FOR FOREIGN AFFAIRS, &c. &c. &c.

## ASTRONOMICAL DETERMINATIONS

[No. 1—TABLE of Astronomical and Geodetical Stations located and determined by the United States and British Commissions from which the 49th Parallel of North Latitude was defined. (To accompany Protocol of Proceedings of the Joint Commission dated Washington, May 7th, 1869)]

Name of points	Latitude north	Longitude west of Greenwich	Name of points	Latitude north	Longitude west of Greenwich
	° ' "	° ' "		° ' "	° ' "
Obelisk at Initial Point.....	49 00 00.0	123 03 53.0	Camp Newholapitkwn.....	48 59 04.3	118 44 28.5
Camp Semiahmoo Observatory.....	49 00 43.1	122 45 30.0	Inchuintum Station.....	48 59 58.5	118 28 12.3
British Station.....	49 00 00.0	122 37 01.6	Camp Statapoosten.....	49 00 10.8	118 16 15.6
Camp Sumass and Station.....	49 01 25.8	122 11 52.8	Camp Columbia.....	48 59 50.4	117 37 41.8
Camp Tummeahai.....	49 02 04.9	121 47 34.4	Fort Shepherd Station.....	49 00 00.0	117 37 19.4
Senesai Station.....	49 00 34.3	121 36 15.4	Pend d'Oreille Station.....	49 00 03.5	117 21 52.9
Ensaikwatch Station.....	49 00 30.0	121 30 41.8	Kootenay Mountain Station.....	49 00 12.8	117 10 48.4
Camp Chiloweyuck.....	49 00 22.2	121 23 41.8	Camp Kootenay West.....	48 59 55.1	116 31 16.2
Camp Chuchchehum.....	49 00 03.7	121 16 41.4	Camp Mooye.....	49 01 26.0	116 12 40.5
Camp Skagit.....	49 00 02.3	121 02 45.2	Yahk Station.....	48 59 55.4	115 38 51.0
Roche Station.....	48 59 49.8	120 39 14.8	Camp Kootenay East.....	48 59 44.6	115 11 19.2
Camp Pasayten.....	48 59 42.6	120 32 12.8	Wigwam Station.....	48 59 42.8	114 45 02.0
Naisnulo Station.....	48 59 53.9	120 00 18.8	Camp Kishenehu.....	49 00 02.8	114 21 09.0
Camp Similkameen.....	48 59 12.1	119 34 53.2	Camp Akamina and Station.....	49 00 52.0	114 03 34.0
Camp Osoyoos and Osoyoos Station.....	49 00 09.9	119 24 12.0			

SAMUEL ANDERSON,  
Lieut. Royal Engrs.,  
Secretary for Captain Haig, A. R.,  
Chief Astronomer.

J. S. HAWKINS,  
Colonel Rl. Engrs.,  
H. B. M. Commissioner.  
7th May, 1869.

Endorsed; 2,  
In COLONEL HAWKINS,  
May 10, 1869.

ARCHIBALD CAMPBELL,  
U. S. Commissioner,  
&c. &c. &c.  
May 7, 1869.

## LONGITUDES AND DESCRIPTIONS OF MONUMENTS

[No. 2—TABLE of Longitudes of Monuments marking the 49th Parallel of North Latitude. (To Accompany Protocol of Proceedings of the Joint Commission dated Washington, 7th May, 1869)]

From what station determined	Longitude west of Greenwich	Description of Mark	No. of Mark	Location
	° ' "			
Camp Semiahmoo Observatory.	123 03 53.0 03 02.9 02 12.7 00 42.9	Obelisk..... Iron pillar..... "..... ".....	1 2 3 4	On west face of Point Roberts. On flat east of obelisk, Point Roberts. On ridge. On east side of Point Roberts.
British Station.	122 43 59.9 42 20.5 41 22.7 40 04.1 38 45.5 37 26.9 37 01.6	Iron pillar..... "..... "..... "..... "..... "..... ".....	5 6 7 8 9 10 11	Near high-water mark, Semiahmoo Bay. On small ridge between swamps. On flat west of Ravine. On flat west of Ravine. On slope south of trail. On first bench south of trail. Latitude mark, British Station.
British Station.	122 36 08.5 34 46.7 33 27.7 32 13.7 31 05.1 30 07.9 29 37.2 28 32.9 27 19.3 25 04.1 24 22.7 23 05.9 22 20.7 21 47.6 20 29.4 19 55.1 19 08.9	Iron pillar..... "..... "..... "..... "..... "..... "..... "..... "..... "..... "..... "..... "..... "..... "..... "..... ".....	12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	On flat near stream and south of trail. On flat south of trail. On ridge south of trail and stream. On flat north of trail. On ridge west of Seh-ko-mehl Creek. On trail crossing line west of Sekomehl Creek. On edge of slope west of swamp and south of trail. On belt of timber between swamps. On slightly elevated ground west of creek. On flat south of trail. On flat south of trail. On trail crossing boundary line east side of creek. On trail crossing line. On flat north of trail. On west side of swamp and north of trail. On trail crossing line. On east side of small lake.
British Station.	122 18 00.6 16 29.1 15 04.1 14 01.0 12 55.2 12 46.3 11 52.8	Iron pillar..... "..... "..... "..... "..... "..... ".....	29 30 31 32 33 34 35	On hill 20 chains east of trail crossing line. On flat north of trail and west of swamp. On top of hill west of swamp and on trail crossing line. On trail crossing line. On Whatcom trail west side Sumass River. On east side Sumass River. Latitude mark, Sumass.

## LONGITUDES AND DESCRIPTIONS OF MONUMENTS—Continued

From what station determined	Longitude west of Greenwich	Description of Mark	No. of Mark	Location
	° ' "			
Sumass Station and Camp.	122 11 00.8 10 02.7 8 38.4 7 50.4 7 21.7 6 31.9 5 26.6 4 45.2	Iron pillar..... "..... "..... "..... "..... "..... "..... ".....	36 37 38 39 40 41 42 43	On mound east of latitude mark. On flat east of stream. On bench west of stream. On face of hill, 5 chains from base and near trail. On bench above rocky precipice east of trail. On top of mountain east side Sumass prairie. On bench at base of hill. On de Lacy's trail, Whatcom to Fort Hope, crossing line.
Camp Tummeahal	121 43 58.1 43 31.6 42 56.3	Pyramid of stones..... "..... ".....	44 45 46	On side of mountain west of falls of creek. On side of mountain south of creek. On side of mountain south of creek.
Sen-eh-say Station.	121 35 28.4	Pyramid of stones.....	47	On east side of Senehsay River.
Ensawkwat Station.	121 30 21.2 30 08.4	Bench mark..... Pyramid of stones.....	48 49	On west side of Ensawkwat River. On east side of Ensawkwat River.
Camp Chiloweyuck.	121 23 48.5 23 11.0	Pyramid of stones..... ".....	50 51	On west side of Klahaihu Valley. On east side of Klahaihu Valley.
Camp Chuckchehum.	121 18 57.3 16 56.2 16 41.4	Pyramid of stones..... "..... ".....	52 53 54	East of and near trail to Skagit. West of and near trail to Skagit. At foot of mountain south of camp.
Camp Skagit	121 04 22.2 02 26.6	Pyramid of stones..... ".....	55 56	Outside of mountains west side of Skagit Valley. On side of hill east of Skagit Valley.
Roche Station.	120 39 47.2 38 51.9	Pyramid of stones..... ".....	57 58	On hill side west of station. On hill side east of river.
Camp Pasayten.	120 32 29.3 32 00.9	Pyramid of stones..... ".....	59 60	On slope west side of Pasayten Valley. On bench east of Pasayten Valley.
Naisnuluh Station.	120 00 46.1 119 59 57.9 58 38.7	Pyramid of stones..... "..... ".....	61 62 63	On sharp ridge west side of stream. East and near to stream. On flat east side of stream.
Camp Similkameen and Camp Osoyoos.	119 42 20.9 40 32.7 39 56.6 37 45.9 36 14.6 33 24.0 29 52.6 28 48.0 26 04.5	Pyramid of stones..... "..... "..... "..... "..... "..... "..... "..... ".....	64 65 66 67 68 69 70 71 72	At foot of mountains west side Similkameen Valley. On left bank of Similkameen. On summit of isolated mountain of Similkameen. East of and near trail up Similkameen. On summit of ridge east of trail up Similkameen. On southern slope of a rocky knoll. On plateau north of Similkameen. Near divide between Osoyoos and Similkameen and near junction of trails. West of trail up west bank of Lake Osoyoos.
Camp Osoyoos and Camp Newhoialpitkwn.	119 24 08.9 22 37.6 21 26.4 18 58.1 17 10.4 14 27.2 11 56.5 10 18.4 9 32.8 8 02.8	Pyramid of stones..... "..... "..... "..... "..... "..... "..... "..... "..... ".....	73 74 75 76 77 78 79 80 81 82	East of trail up east bank of Lake Osoyoos. Summit of first ridge east of Lake Osoyoos. On spur from mountain to the north. On spur from mountain to the north. North and west of small creek. South-east of Colville trail. North of Small Lake. On first bench west of fork of Rock Creek. In valley of fork of Rock Creek, west bank. On summit east of fork of Rock Creek.
Camp Osoyoos and Newhoialpitkwn.	119 6 15.0 4 36.0 2 54.9 1 23.0 118 59 33.6	Pyramid of stones..... "..... "..... "..... ".....	83 84 85 86 87	On rocky ridge east of Small Lake. On high plateau south of Rock Creek. On high plateau south of Rock Creek. On high plateau south of Rock Creek. On valley east of wagon road to Rock Creek.
Camp Osoyoos and (1869) Camp Nehoialpitkwn.	118 56 58.9 55 58.2 55 05.0 53 06.6 52 26.6 51 14.9 48 27.3 46 45.6 45 48.9 45 12.6	Pyramid of stones..... "..... "..... "..... "..... "..... "..... "..... "..... Mound of earth.....	88 89 90 91 92 93 94 95 96 97	On summit east of wagon road to Rock Creek. On ridge between two creeks. On same ridge. On same ridge. On same ridge. On point of ridge south and east of creek. In valley of Nehoialpitkwn. On point of ridge in bend of Nehoialpitkwn. On point of ridge in bend of Nehoialpitkwn. At foot of mountain right bank of Nehoialpitkwn.
Camp Nehoialpitkwn and Inchointum Station.	118 44 13.8 43 24.5 42 38.4 41 49.6 40 57.2 39 51.5 38 24.9 36 43.4 33 43.0 31 28.4 29 48.7 28 40.8	Pyramid of stones..... "..... "..... "..... "..... "..... "..... "..... "..... "..... "..... ".....	98 99 100 101 102 103 104 105 106 107 108 109	East of and near Colville Trail. In open country east of Rock Creek. In open country east of Rock Creek. In open country east of Rock Creek. At northern slope of mountains. At northern slope of mountains. On sharp ridge between heads of tributary of Rock Creek. On divide between Rock Creek and Newhoialpitkwn. On summit between two creeks. On first bench west of Small Creek. On first plateau west of river. On first plateau west of river.

## LONGITUDES AND DESCRIPTIONS OF MONUMENTS—Continued

From what station determined	Longitude west of Greenwich	Description of Mark	No. of Mark	Location
Inchuintum Station and Camp Statapoosten.	118 27 40.8 26 32.6 25 38.2 24 07.2 22 18.6 21 36.3 18 45.4 16 36.7	Pyramid of stones..... "..... "..... "..... "..... "..... "..... ".....	110 111 112 113 114 115 116 117	In valley near and east of Colville Trail. In valley of Newhollpitkwn south of river. In valley of Newhollpitkwn south of river. In valley of Newhollpitkwn south of river. On high ridge south of river. On high ridge south of river. On high ridge south of river. On north slope of mountains south of river.
Camp Statapoosten.	118 14 21.0 13 19.1 11 56.1 09 58.2 09 26.0 05 15.8 03 17.1 01 52.2 117 59 00.9 53 08.1 45 49.5 41 17.7 38 49.1 37 36.2 37 05.2	Pyramid of stones..... "..... "..... "..... "..... "..... "..... "..... "..... "..... "..... "..... "..... "..... ".....	118 119 120 121 122 123 124 125 126 127 128 129 130 131 132	On point of ridge right side of valley. In valley near trail to Colville. On a gravel ridge west of river. On side of mountain east of Neholalpitkwn River. On hill west side of stream. On hill between streams. On slope between streams. On slope between streams. On side of hill between streams. On side of hill between streams. On side of hill between streams. On side of hill between streams. On hill top west of Camp Columbia. On brink of hill west bank Columbia River. Near east bank of river.
Fort Shepherd Station.	117 36 59.4	Pyramid of stones.....	133	Near east bank of Columbia River.
Pend d'oreille R. Station.	117 21 52.9 22 03.0 22 54.8	Pyramid of stones..... "..... ".....	136 135 134	Latitude mark, Pend d'oreille Station. On bench west side of river. On high ridge west.
Kootenay Mountain Station.	117 09 56.5 08 55.9	Bench mark..... Pyramid of stones.....	137 138	On face of rock ridge east. On bench, west side, south fork Salmon River.
Camp Kootenay, West.	116 35 44.9 31 05.9	Pyramid of stones..... ".....	139 140	On side of mountain west side of valley. On brow of first hill right bank river.
Camp Mooyie, Mooyie trail monument.	116 14 59.2	Pyramid of stones.....	141	On trail leading from the north to Chelemta.
Camp Mooyie.	116 12 22.3 11 54 11 25.6 11 24	Pyramid of stones..... "..... "..... ".....	142 143 144 145	On side of mountain west side of valley. Approximate on plateau above creek. On left bank of creek close to water. Approximate on high bluff west bank.
Yahk Station.	115 39 46.5 39 24.5 39 10.5 38 29.5 38 02.8	Pyramid of stones..... "..... "..... "..... ".....	146 147 148 149 150	On west side of river. On west side of river. Near east bank of river. On hill side east of river. On hill side east of river.
Camp Kootenay, E., 1869.	115 16 01.4 11 11.2 10 11.6 3 28.7	Pyramid of stones..... "..... "..... ".....	151 152 153 154	On east brink ravine beyond which the mountains rise. On right bank Kootenay River. On second plateau, left bank river. At foot of mountains left bank small creek.
Wigwam Station.	114 45 16.1 45 42.0	Pyramid of stones..... ".....	156 155	Near west bank of river. On hill west of river.
Camp Kishenehu.	114 28 02.5 27 09.4 21 17.3 20 53.9	Pyramid of stones..... "..... "..... ".....	157 158 159 160	On second terrace left bank Flathead River. On first bench right bank Flathead River. Near trail entering Boundary Pass. On left bank of Kishenehu Creek.
Akamina Camp and Station.	114 03 28.41	Pyramid of stones.....	161	On the Divide of the Rocky Mountains.

SAMUEL ANDERSON,  
Lieut. Royal Engrs.,  
Secretary for Captain Haig, R. A.,  
Chief Astronomer.

J. S. HAWKINS,  
Colonel Royal Engrs.,  
H. B. M. Commissioner,  
May 7th, 1869

Endorsed: 3.  
In COLONEL HAWKINS.  
May 10th, 1869.

ARCHIBALD CAMPBELL,  
U. S. Commissioner,  
&c. &c. &c.  
May 7th, 1869.



## OFFICIAL DESCRIPTION OF THE BOUNDARY

In the absence of the final report of the United States Commissioner, the final report of the British Commissioner and the protocol of February 24th, 1870, signed by Hamilton Fish and Sir Edward Thornton seem to be the only evidence as to what constitutes the official description of this boundary line as surveyed and marked by the Commissioners of 1857-69 and as agreed upon in the protocol just referred to. From these records it appears that the two sets of seven original maps jointly signed by the Commissioners on May 7, 1869, and the agreements of the Commissioners contained in the minutes of the meeting, together with the two tables of geodetic coordinates attached to these minutes and jointly signed by the two Commissioners on May 7, 1869, constitute the entire official description of this boundary line.

While the two sets of seven signed maps are usually considered to be duplicates, this is not strictly true. "The two sets of seven Maps" were "prepared severally by the respective commissions" and upon comparison the British maps were found to "require some trifling corrections of detail and the addition of some names common to the two sets." In relation to these corrections, Lieutenant S. Anderson, secretary to the British Commission, in a letter of July 22, 1869, directed to Edmund Hammond, Under Secretary of State, Foreign Office, says:

I have the honour to inform you that I deposited with Mr. Hertslet at the Foreign Office on the 17th inst: the series of *Maps* of the North American Boundary Commission amounting in all to 21 sheets, that had been left in my charge for the purpose of making certain alterations and additions that had been noted during the verification of the series with the American Maps at Washington. The corrections required have been made to all the maps except the series bearing the signatures of Colonel Hawkins and the American Commissioner, which are the joint maps of the Commission.

The corrections and additions required to make the joint maps agree with the American maps have not been made, as Mr. Byrgne instructed me to make no alterations in the maps, over the signatures of the Commissioners. A list of the corrections, &c., required is forwarded herewith, as a record of errata and addenda to be referred to whenever the maps are consulted. I beg to add that the American Commissioner in order to save time, signed our maps subject to the corrections, then only made in pencil on the maps, being properly made in ink on our return to this Country, and the list of corrections required as per accompanying list, mentioned above, was prepared in the presence of the American Chief Astronomer.

The list of corrections shows nothing more than minor corrections in the topography and names, and not being useful except in conjunction with the maps is here omitted.

In addition to the two sets of seven jointly signed official maps, each section of the Commission produced other finished maps which are filed with their Governments.

Those of the United States section of the Commission include an index map, a general map of the eastern section, and a general map of the western section. There are also copies of the seven detailed maps that finally became the official signed maps of May 7, 1869. The drawing of these seven maps appears to have been practically completed about the beginning of 1865. In 1866 a photographic copy of them was furnished to the General Land Office of the United States, accompanied by tables of the geographic coordinates of the camps, stations, and monuments. It is from these Land Office records that Marcus Baker obtained the data for the tables listed under the heading "From American Sources" which are given in his "Survey of the North-

western Boundary of the United States," Geological Survey Bulletin No. 174. It will be noted by comparison that the tables as thus given differ somewhat from the tables signed by the Commissioners in 1869 and can be considered only as preliminary and subject to correction. The seven detailed maps were also reproduced by photolithography at some time prior to the time of their adoption by the Commission in 1869. The reproduction was made on twice the scale of the original drawing (i. e., 1:60,000). They were printed by the New York Lithographing, Engraving, and Printing Company, Julius Bien, Superintendent. The size of the edition does not appear. This reproduction must also be considered as preliminary.

In regard to British maps of the survey, Commissioner Hawkins, in a letter to E. Hammond, Under Secretary of State, Foreign Office, dated April 30, 1864, says:

I did not overlook the instructions conveyed to me in your letter of the 29th September last respecting the deposit of the maps &c. if possible in some fireproof building previously to their being finally authenticated by the joint Commission. Though not fireproof, this office is I hope safe from fire; but it is necessary to have the maps at hand while they remain incomplete.

On their being quite finished I intend to submit to Earl Russell a proposition to obtain a few copies of them, for public use and record, by means of the photo-zincographic process which can I believe be readily done at the Ordnance Survey establishment at Southampton at very small cost; after which, on their being bound up, and merely awaiting authentication by the joint Commission they might be deposited in the Foreign Office, or at such other place as his Lordship might approve.

The maps are again the subject of discussion in the following letter written by Commissioner Hawkins.

H. M. BOUNDARY COMMISSION,  
*New York, 15th May, 1869.*

MY LORD,—In the 2nd paragraph of my letter of the 10th instant reporting the closing proceedings of the joint Commission for the determination of the Land Boundary between the British Possessions and the United States under the Treaty of the 15th June, 1846, I stated upon the completion of some corrections and additions to the maps they would be conveyed to the Foreign Office by Lieut: Anderson R. E. secretary of the Commission to be disposed of as your Lordship should direct.

2. The maps consist of a set of seven, which are authenticated by the counter-signature of the United States Commissioner and are those alluded to in the 2nd article of the closing protocol;—of a set of six showing the Boundary upon the larger scale of one inch to a mile, which would be of more general use than the smaller maps, and by which the Boundary marks and forest cuttings, &c., are more distinctly shown so that by means of them the points on the Boundary could be more easily identified; of an index map in two sheets; and of a general map in three sheets, showing the whole Boundary from the Lake of the Woods to the Gulf or Straits of Georgia, which was compiled from the best data at our command when it was prepared. There are also three title pages for the two sets of Boundary Maps and the General Map making 21 sheets in all.

3. I beg respectfully to recommend to your Lordship that the whole of these maps be carefully mounted on cloth and bound together as the official record of the execution of so much of the Treaty as relates to the Land Boundary. I have directed Lieut: Anderson to have an index sheet of the positions of the Astronomical Stations and Boundary marks prepared, to be bound up with the maps, and I beg also to suggest that one or two sheets of photographic representations of the Obelisk at Point Roberts, of the stone cairn at the Eastern terminus of the Boundary on the Watershed of the Rocky Mountains, and of the cairns and cuttings at several intermediate points be bound up with them, for which object I have desired the necessary preparations to be made.

4. I learn from Lieut: Anderson that all the maps were photo-zincographed at the Ordnance Survey Office, Southampton, before being brought by him to this country. Copies of them will be very valuable for various purposes and in several of the public offices, such as the Foreign and Colonial Offices, the Topographical Office, and for use in the Colony of British Columbia; and I therefore think that owing to the alterations above alluded to fresh plates of at least the joint maps will be necessary. The cost of them will I believe not be very large; and it is most desirable that the copies should be fac-similes of the Authenticated Maps. The additions to the index and general Maps are of less importance, but of them too accurate copies are to be preferred, and would I think be worth the expense.

5. A very interesting representation of the entire Boundary would be obtained by a set of the joint maps being mounted in a roll, the sheets being joined together at the common meridians so as to shew the continuous line of Boundary and the curve of the Parallel. This might be kept with the original maps, in a tin case.

6. I have undertaken to recommend to your Lordship that a complete set of copies of the British maps be sent to the State Department of the United States for deposit with their own original maps, as a complete record of our joint operations—to which I hope your Lordship will be pleased to accede;—and I venture further to suggest that those maps be also mounted and bound. Mr. Campbell the U. S. Commissioner has intimated his intention to supply us with copies of such of the American maps as may be photographed.

I have the honour to be,

Your Lordship's most obedient humble servant

J. S. HAWKINS  
Colonel Rl. Engrs.  
H. M. Commissioner.

The Right Honble.

The SECRETARY OF STATE FOR FOREIGN AFFAIRS &c. &c. &c.

On July 22, 1869, the secretary to the British Commission, Mr. Anderson, writes of the final disposal of the British maps in the letter which has already been quoted on page 208.

It will be noted from these letters that Commissioner Hawkins recommended that "a complete set of the copies of the British Maps be sent to the State Department of the United States \* \* \*." This recommendation was carried out on June 23, 1871, by the British Minister in Washington, Sir Edward Thornton, by the delivery to the State Department of an atlas entitled:

Maps of the land boundary between the British possessions in North America and the United States as established by the treaty of Washington, 15th June, 1846, and surveyed and marked under the direction of the Joint Commission appointed to carry into effect the 1st article of the treaty. Scale 1:120,000, or 1.8939 statute miles to one inch. Photo-zincographed at the ordnance survey office, Southampton, under the superintendence of Cap't. Parsons, R. E., F. R. A. S.; Col. Sir Henry James, R. E., F. R. S., etc., director, 1869.

It is from this atlas that Mr. Baker copied the data for tables II and III, geodetic coordinates under the heading "From British Sources", in his "Survey of the North-western Boundary of the United States." The tables as contained in the atlas differ slightly from the tables signed by the Commissioners on May 7, 1869, and are probably a copy of the British tables before comparison and correction at the Joint Conference of the Commissioners of May 7, 1869.

A study of the records, data, and maps, both preliminary and final, that have been described in the preceding pages makes possible a fairly accurate description of the methods and results of the field work.

#### METHODS AND RESULTS OF FIELD WORK

In the absence of any previous geodetic surveys in the country traversed by this section of the boundary, astronomic observations for latitude had to be made in order to determine the parallel of forty-nine degrees. Such observations were made at selected stations within easily measurable distances of the parallel. The observations were made with great care and a high degree of precision was attained. Many of the stations were observed by both sections of the Commission and the work of one checked against that of the other. After the latitude of the station had been determined, a point on the parallel was established by measuring the required distance north or south, as the case might be, from the station to the parallel.

The boundary was then traced along the parallel from the established point by the method of offsets from the tangent to the parallel, the tangent being determined by means of astronomic observations for azimuth. Twenty-nine latitude stations were established in this manner between Point Roberts and the summit of the Rocky Mountains. These stations are listed together with their latitudes and longitudes in the table on page 205.

The longitudes of some of the stations were obtained by observations of the moon's culmination. From these stations other longitudes were obtained by carrying chronometers between the stations for comparison of the observed time of the known station and of the station to be determined. Measured distances between monuments established along the boundary were also used to obtain differences of longitude.

In all these geodetic operations the computations were based on Bessel's spheroid.

The boundary was established and marked from these astronomic latitude stations at varying intervals and for varying distances as the character of the country and proximity of settlements seemed to demand.

From the western shore of Point Roberts to the western base of the Cascade Mountains, a distance of about 45 miles, the line was established continuously and marked by cutting a vista and by setting 1 granite and 42 cast-iron monuments. This portion of the line was determined from 4 latitude stations.

Through the rugged and unsettled Cascade Mountains the parallel was determined and marked for a short distance only at each of nine stream crossings. An astronomic latitude was observed to determine the parallel at each of these places. The unmarked intervals between them varied from 4 to 24 miles. These nine latitude stations were not connected with each other by surveys.

East of the Cascade Mountains, beginning at the Similkameen River and extending to the most eastern crossing of the Kettle River, the line traverses a broken and rolling country with many fine open valleys and fertile uplands. Colonel Hawkins, the British Commissioner, says of it:

The country westward [from Lake Osoyoos] to the Similkameen and eastward for a long distance, though hilly or even mountainous yet being generally open, with only occasional patches of forest, and being very suitable for such an operation it was determined to run and mark the Boundary line in conformity with the proposition made by me to the United States Commissioner at the joint Commission meeting in April, 1859 [see agreement of Commissioners, p. 199.] though it was not then adopted or even entertained by him. The valley of the Newhoialpitkw [Kettle River], which the Boundary reaches at a distance of 9 miles from Lake Osoyoos and which it follows generally for a further distance of nearly 50 miles, is of very great importance; traversed as it is by the "brigade trail" of the Hudson's Bay Company, forming the high road between this part of the Columbia River district and the Fraser and Thompson Rivers, and being in fact one of the main arterial lines of communication in the country, in use probably by the Indians for ages. The mining settlement of Rock creek, at the junction of that tributary with the main stream (itself a tributary of the Columbia into which it flows 2 miles above Fort Colville) has recently been formed on the banks of the river; and a waggon road leads to it from the Dalles by the valleys of the Columbia and Okanagan Rivers, by which route goods are introduced into British Columbia. Other Auriferous streams near the Boundary have also been more or less worked within British and United States territory.—Furthermore, the valley contains a large extent of grazing land, which is available also though perhaps it may not be very suitable for agricultural purposes; and settlers are beginning to appear, though their permanency is probably dependent on the market offered to them by the uncertain wants of an

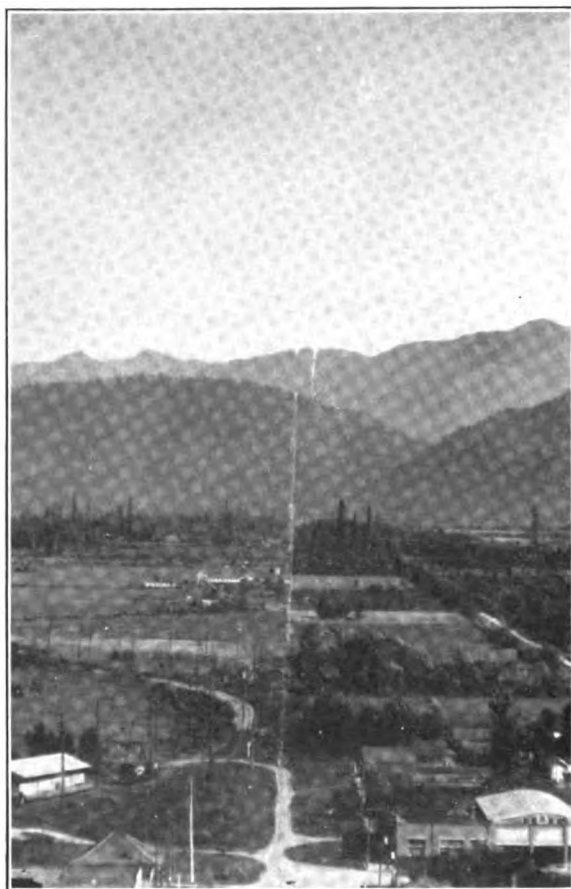
erratic gold-seeking population. From these considerations it would appear that *if* the actual Boundary was to be defined by the joint Commission in any part of the space intervening between the waters of the Pacific and the Rocky Mountains, the interval between the Similkameen and the Columbia Rivers is not only of as much importance as, if it be not of greater importance than, any other part of the line; but it also presented greater facilities for the performance of the necessary operations, while it embraces about a fourth of the whole extent of Land Boundary comprehended in the Treaty under which the Commission was appointed.

Following his convictions regarding this section of the boundary, Colonel Hawkins proceeded to locate and mark it throughout. Seven latitude stations were established

along this part of the line, and the observations were made by the astronomers of both sections of the Commission.

Beginning at astronomic station "Osoyoos", on the east bank of Osoyoos Lake, the British party ran the parallel westward to the Similkameen River, marking it, as they went, with pyramids of stones. At the Similkameen River the line thus run fell 509 feet to the north of the monument set from station "Similkameen" by the United States party. Proceeding eastward from station "Osoyoos", the British party ran the parallel, marking it as before with pyramids of stones, as far as the western crossing of the Newhoialpitkwn, or Kettle River, where it closed 364 feet to the north of the parallel as established from latitude station "Newhoialpitkwn."

The British parties also ran the parallel both east and west from astronomic station "Inchiuntum" at the second crossing of the Kettle River. The westward line fell 300 feet to the south of the astronomic determination at the western crossing of the Newhoialpitkwn, and 664 feet south of the line as brought from station "Osoyoos." The eastward line fell 180 feet north of the parallel, as



THE BOUNDARY LINE EAST FROM MONUMENT 31. THE TWO VISTAS ON THE FAR RIDGE ILLUSTRATE A GREAT DEFLECTION OF THE LINE DUE TO "STATION ERROR" OF LATITUDE STATIONS. THE LEFT HAND, OR NORTH VISTA, IS WHERE THE LINE WOULD HAVE FALLEN HAD THERE BEEN NO "STATION ERROR." THE RIGHT HAND, OR SOUTH VISTA, IS ON THE LINE AS ESTABLISHED BETWEEN LATITUDE STATIONS. THE FAR RIDGE IS ABOUT 14 MILES FROM THE CAMERA

established from station "Statapoosten", at the most eastern crossing of the Newhoialpitkwn or Kettle River. This line, from the Similkameen to the most eastern crossing of the Kettle River, about 70 miles in length, was marked with 55 pyramids of stones about 6 feet square and 8 feet high placed at the most prominent and suitable points, and a continuous vista was cut between the pyramids wherever timber occurred.

This work was completed late in December 1860, and while not satisfactory to the British astronomers no corrections or modifications of the line could be made until the following spring.

Concerning these discrepancies, Commissioner Hawkins, in a letter dated April 12, 1861, says:

I stated that the Boundary so carefully and completely defined and marked by Captn. Haig and Lieut: Anderson in the past season, between the Similkameen and the western intersection of the Newhoialpitkw at Statapoosten would require revision. This necessity arises from the connections made between the various British and American points on the Boundary derived from the astronomical operations at the several stations showing great and unexpected discrepancies in the latitude of the points. The results of the astronomical operations by both Commissions seem to be in the highest degree satisfactory; the points on the 49th parallel derived from those results are not liable to errors which can be detected at the stations themselves; the country through which the connections have been made is of a generally favourable character; and the method of connection does not permit of errors at all approaching in magnitude the discrepancies found to exist. There seems to be no way of explaining these discrepancies except by attributing them principally to local causes affecting the astronomical observations similar to those vitiating the determinations at Schweltza<sup>3</sup> alluded to in paragraph 16 of my despatch No. 9 dated 21st May, 1860; and which probably affect more or less every station between the sea and the Rocky Mountains. Two ways of dealing with this difficulty presented themselves either to connect the adjacent stations by curves representing and having the properties of the 49th parallel (there being no apparent reason for preferring or rejecting the determination of any one of the stations) which might have been the preferable method had there been grounds for suspecting the accuracy of the manner of making the connections, and which will be followed in revising the line between Semiahmoo and Sumass; or to adopt a mean parallel from the continuation of the several astronomical results and their connections, from that mean to correct the result obtained at each station and to run, and mark a parallel coinciding with those corrections. There are two British and three U. S. determinations of latitude in the space of nearly 65 miles, from between the Similkameen River and Osoyoos Lake, to Statapoosten, the greatest discrepancy is between the British station at Osoyoos and the U. S. station at Statapoosten, which differ about 860 ft; and none of the stations agree within less than about 180 ft which is the difference between Statapoosten and the British station at Inshwointum. In this case, the first plan would certainly not produce a *parallel* of latitude and thus would knowingly fail to fulfil the provisions of the Treaty—The second plan would result in a parallel which would probably be the nearest approach to an accurate determination of the 49th parallel that any but a very elaborate and extended course of observation could arrive at. Captn. Haig has written at length to Mr. Airy the Astronomer Royal on the subject of these unwelcome and very unexpected discrepancies and on the method of dealing with them. At a meeting at this place on the 4th of March, attended by Lieut: Parke, the U. S. Chief Astronomer, in the absence of the Commissioner, Mr. J. S. Harris, one of the U. S. assistant Astronomers, Captn. Haig and myself—the above question, and the plan of this year's operations were discussed; and it was agreed that a mean parallel should be adopted, and a new line run and marked from the Similkameen to Statapoosten—This Lieut: Parke has undertaken to do, on the part of the U. S. Commission, on satisfying himself as to the existence and amount of the alleged discrepancies.

The running of the mean parallel from the Similkameen to the most eastern crossing of the Kettle River was carried out by Lieutenant Parke as planned, during the summer of 1861. The mean parallel was marked with pyramids of stones at points corresponding to the points marked on the original line and the pyramids marking the original line were torn down with the exception of one on the high hill just south of the present town of Midway, which was overlooked. The vista on the mean parallel, however, was not cut continuously; it was cut only across the summits of the ridges and in proximity to the pyramids. The effect of this was that two lines were left marked upon the ground—the abandoned line well marked by a continuous vista and with the remains of the demolished cairns, and the final or official line which was left poorly marked by a vista though well marked by stone

<sup>3</sup> The discrepancy between the Schweltza and the Sumass Station was 8 seconds of latitude, about 800 feet, in a distance of about 9 miles. Although this discrepancy was apparently due to local station deflection of the plumb line at Schweltza, the latitude of Schweltza was discarded.

pyramids. This dual marking resulted in much local confusion in the years following and continued down to the present day. In a number of places the old stone piles and the vista of the original line are still plainly discernible.

Between the most eastern crossing of the Kettle River and the Columbia River the line was run on the approximate curve of the 49th parallel from the eastern terminus of the mean parallel to the astronomic determination of the parallel on the west bank of the Columbia. This section of the line was marked continuously with stone pyramids and a vista cut through the timber.

From the Columbia River eastward to the summit of the Rocky Mountains the parallel was marked at the crossing of the Pend-d'Oreille (Clark Fork) for a distance of about 1 mile, at the crossing of South Fork Salmon River for about 1 mile, at the western crossing of the Kootenai for about 4 miles, at the Moyie River crossing for about 3 miles, at the crossing of the North Fork of the Yaak River for about 1 mile, across the valley of the eastern crossing of the Kootenai for about 10 miles, at the crossing of the Wigwam River for about one-half mile, across the valley of the Flathead for about 5 miles, and finally by a cairn on the crest of the watershed of the Rocky Mountains high above the timber line. None of these intermittent markings were connected by surveys; in each case the parallel was determined from an independent astronomic station.

It will be noted from the foregoing paragraphs that the boundary as established was located from astronomic observations for latitude and was intended to follow the astronomic 49th parallel. That it does not strictly do so is shown by the discrepancies found to exist between the latitude stations connected with each other. It is now known through recent surveys that discrepancies of like character and of varying magnitude, attributed to local deflections of the plumb line, exist between the astronomic stations that were not connected with each other in the original survey, and that at best the whole line is but an approximation of the astronomic 49th parallel. However, the adverse conditions of transportation and travel through what was at that time a sparsely settled wilderness fully justified the original Commissioners in locating and marking the various portions of the line in the manner in which they did.

In addition to the work of locating and marking the boundary a great amount of work was required to collect the data for compiling the final maps of the Commission. Elevations of a large number of points were determined by barometric observations. Small schemes of triangulation were executed from time to time, streams and trails were traversed, and mountain points were cut in from the traverses. All this work was done in great detail as is evidenced by the maps themselves.

This concludes the brief outline of the work of establishing the boundary west of the Rocky Mountains by the Commission of 1857-1869.

#### BOUNDARY EAST OF THE SUMMIT OF THE ROCKY MOUNTAINS

This section of the boundary was first defined in the second article of the convention between the United States and Great Britain of October 20, 1818, whereby it was provided:



\* \* \* that a Line drawn from the most North Western Point of the Lake of the Woods, along the forty Ninth Parallel of North Latitude, or, if the said Point shall not be in the Forty Ninth Parallel of North Latitude, then that a Line drawn from the said Point due North or South as the Case may be, until the said Line shall intersect the said Parallel of North Latitude, and from the Point of such Intersection due West along and with the said Parallel shall be the Line of Demarcation between the Territories of the United States, and those of His Britannic Majesty, and that the said Line shall form the Northern Boundary of the said Territories of the United States, and the Southern Boundary of the Territories of His Britannic Majesty, from the Lake of the Woods to the Stony Mountains.

It was again defined in the second article of the Webster-Ashburton Treaty of 1842 as:

\* \* \* to the said most northwestern point [of Lake of the Woods], being in latitude  $49^{\circ}23'55''$  north, and in longitude  $95^{\circ}14'38''$  west from the Observatory at Greenwich; thence, according to existing treaties, due south to its intersection with the 49th parallel of north latitude, and along that parallel to the Rocky Mountains.

Great Britain had proposed the demarcation of this section of the boundary at the time the demarcation of the boundary west of the Rocky Mountains was undertaken. The general instructions of date of March 30, 1858, issued by his Government to Captain Hawkins mentions the proposal in the following paragraph:

It is possible that you will hereafter be required to continue the survey from that point [Rocky Mountains] to the Lake of the Woods. Her Majesty's Government have made a proposal to that effect to the Government of the United States, but whether the proposal is accepted or not you will have in all probability sufficient work to occupy you for two seasons in surveying the Boundary under the Treaty of 1846.

By the act of Congress of March 19, 1872, entitled "An act authorizing the survey and marking of the boundary between the territory of the United States and the possessions of Great Britain, from the Lake of the Woods to the summit of the Rocky Mountains", the President of the United States was authorized to cooperate with the Government of Great Britain in the appointment of a Joint Commission for determining the boundary line between the United States and the British possessions, between Lake of the Woods and the Rocky Mountains. The immediate cause of this authorization by Congress was set forth by the President of the United States in his annual message to Congress dated December 5, 1870, as follows:

In April last, while engaged in locating a military reservation near Pembina, a corps of United States engineers discovered that the commonly-received boundary-line between the United States and the British possessions at that place is about forty-seven hundred feet south of the true position of the forty-ninth parallel, and that the line, when run on what is now supposed to be the true position of the forty-ninth parallel, would leave the fort of the Hudson Bay Company, at Pembina, within the territory of the United States. This information being communicated to the British Government, I was requested to consent, and did consent, that the British occupation, of the fort of the Hudson Bay Company should continue for the present. I deem it important however, that this part of the boundary-line should be definitely fixed by a joint commission of the two governments, and I submit herewith estimates of the expense of such a commission on the part of the United States, and recommend that an appropriation be made for that purpose. The land-boundary has already been fixed and marked from the summit of the Rocky Mountains to the Georgian Bay. It should now be in like manner marked from the Lake of the Woods to the summit of the Rocky Mountains.

Mr. Archibald Campbell, who had been Commissioner on the joint survey west of the summit of the Rocky Mountains, was appointed by the President as United States Commissioner. Great Britain appointed Capt. Donald R. Cameron, R. A., as British Commissioner.



Joint field operations were begun by the Commission about the middle of September 1872, at Pembina, on Red River. Field operations were completed late in the autumn of 1874.

At the close of the field work of the Commission, the United States section of the Commission set up offices in Washington for the purpose of working up the notes of the survey and compiling the maps of the boundary line and the country adjacent thereto. The British section of the Commission returned to London and there executed their office work.

In March 1876, the British Commissioner notified the United States Commissioner that the work of the British section of the Commission was ready for the final meeting of the Joint Commission and requested that if convenient the meeting be held in London. Accordingly, the joint meeting was held in London during the months of April and May 1876. The United States and British Chief Astronomers compared the records and maps of the respective sections of the Commission, and having reported them satisfactory and the maps ready for the signatures of the Commissioners, the maps were duly signed, together with a protocol of the final proceedings of the Commission on May 29, 1876. This completed the work of the Joint Commission and it adjourned *sine die*.

#### FINAL PROCEEDINGS OF THE COMMISSION

The final records and maps of the Commission are on file in the Foreign Office at London and in the archives of the Department of State in Washington. They are enumerated in a protocol of the final proceedings of the Commission of which the following is a copy:

RECORD OF PROCEEDINGS AT A MEETING OF THE COMMISSIONERS APPOINTED RESPECTIVELY BY THE PRESIDENT OF THE UNITED STATES OF AMERICA, AND BY HER BRITANNIC MAJESTY, TO ASCERTAIN AND MARK THE BOUNDARY-LINE BETWEEN THE RESPECTIVE TERRITORIES OF THE UNITED STATES AND OF HER MAJESTY, THE SAID LINE BEING THAT DEFINED BY THE SECOND ARTICLE OF THE CONVENTION OF LONDON, SIGNED OCTOBER 20, 1818

Present:

Donald R. Cameron, major Royal Artillery, commissioner on the part of Her Britannic Majesty.

S. Anderson, captain Royal Engineers, chief astronomer to Her Majesty's commission.

A. C. Ward, captain Royal Engineers, secretary to Her Majesty's commission.

Archibald Campbell, commissioner on the part of the United States of America.

W. J. Twining, captain of the Corps of Engineers of the United States Army, chief astronomer to the United States commission.

1. The chief astronomers submit the following documents and maps:

a. A detailed list in duplicate of forty astronomical stations, in addition to one for the location of the most northwestern point of the Lake of the Woods, at which observations were taken under their superintendence, to determine the line described in the second article of the convention of London (signed October 20, 1818) between the terminal points, viz, the most northwestern point of the Lake of the Woods and the eastern end of the international boundary-line previously marked between Akamina, in the Rocky Mountains, and the western coast of North America.

b. A descriptive list in duplicate of three hundred and eighty-eight (388) monuments and marks placed on the boundary-line, as derived from the astronomical stations enumerated in the list referred to in section *a* of this paragraph.

c. A duplicate set of twenty-four (24) maps on a scale of 1/126720, or 1 inch to 2 miles, illustrating the topography of the country through which the boundary-line runs, and indicating

the relative positions of the various monuments and marks referred to in section *b* of this paragraph.

2. The second article of the convention of London, signed 20th October, 1818, is read, as follows:

"It is agreed that a line drawn from the most northwestern point of the Lake of the Woods, along the forty-ninth parallel of north latitude, or if the said point shall not be in the forty-ninth parallel of north latitude, then that a line drawn from the said point due north or south, as the case may be, until the said line shall intersect the said parallel of north latitude, and from the point of such intersection due west, along and with the said parallel, shall be the line of demarcation between the territories of His Britannic Majesty and those of the United States, and that the said line shall form the southern boundary of the said territories of His Britannic Majesty, and the northern boundary of the territories of the United States, from the Lake of the Woods to the Stony Mountains."

The duplicate documents and maps enumerated in paragraph numbered one (1)—one set for each of the respective governments—having been examined and compared, are authenticated by the signatures of the commissioners, who agree as follows:

1. The three hundred and eighty-eight (388) monuments detailed in the list referred to in section *b* of paragraph numbered one, are on and mark the astronomical lines stipulated by the second article of the convention of London (signed October 20, 1818) to be the line of boundary between the territories of Her Britannic Majesty and of the United States of America, from the Lake of the Woods to the Stony (i. e., Rocky) Mountains.

2. In the intervals between the monuments along the parallel of latitude, it is agreed that the line has the curvature of a parallel of 49° north latitude; and that such characteristic shall determine all questions that may hereafter arise with reference to the position of the boundary at any point between neighboring monuments.

3. It is further agreed that, in the event of any of the said three hundred and eighty-eight (388) monuments or marks being obliterated beyond the power of recognition, the lost site or sites shall be recovered by their recorded position relatively to the next neighboring unobliterated mark or marks.

ARCHIBALD CAMPBELL,  
*United States Commissioner, London,*  
*May 29, 1876.*

D. R. CAMERON,  
*Major, R. A., Her Britannic Majesty's Commissioner, London,*  
*May 29, 1876.*

The United States Commission made a very full and detailed report to the Department of State on the work of the Joint Commission. A limited edition of this report was printed under the title "Survey of the Northern Boundary of the United States from the Lake of the Woods to the Summit of the Rocky Mountains", in 1878. The 24 official, signed maps were also reproduced and printed. Copies of this report and of the maps are on file in the archives of the Department of State, in the Library of Congress, and in other governmental offices in Washington.

The British Commissioner, Major Cameron, likewise made a report to his Government, which together with 3 appendixes are on file in the Foreign Office in London. A limited edition of Major Cameron's official report, without the appendixes, was printed for the use of the Foreign Office, August 1876, marked "Confidential", under the heading "North American Boundary Commission from the most North-Western Point of the Lake of the Woods to the Stony Mountains."

Should the reader desire a detailed description of this section of the boundary and its survey, it is available in the records and reports that have been referred to herein.

## APPENDIX IV

### ELEVATIONS ALONG THE 49TH PARALLEL BOUNDARY

#### ELEVATIONS AND DESCRIPTIONS OF BENCH MARKS

Under this heading are given the elevations and descriptions of all permanent bench marks established or used in the survey of the International Boundary from Georgia Strait to the Northwesternmost Point of Lake of the Woods. The list includes bench marks of the Geodetic Survey of Canada, the United States Coast and Geodetic Survey, the United States Geological Survey, and of other agencies of the two Governments. Following this list is a list of elevations of the ground at boundary monuments along several sections of the boundary where level lines were run but no permanent bench marks were established.

The elevations of the bench marks of the Geodetic Survey of Canada are given as published in 1929 and 1930 <sup>1</sup> and these elevations were used as the basis for the reduction to a common datum of the elevations of all the other bench marks listed. All of the elevations here listed are in feet and are referred to mean-sea-level datum as defined in the Geodetic Survey of Canada publications of 1929 and 1930 above referred to.

#### THE WASHINGTON-BRITISH COLUMBIA LINE

	Elevation (feet)
International Boundary Monument 5, 7 feet west of; at Blaine, Whatcom County, Wash.; ½ mile north of the Great Northern Railway station, 40 feet east of the railway track; Geodetic Survey of Canada first-order bench mark, a copper bolt marked "G. S. C. B. M. 19-J" set horizontally in the north face of a concrete bench-mark pier.....	2 18. 324
Blaine, Whatcom County, Wash.; in a stone step on the north side of the main entrance to Blaine Hotel; an aluminum disk marked "U. S. Geological Survey B. M. 41-B." It is also United States Coast and Geodetic Survey first-order bench mark I-6.....	42. 235
Blaine, Whatcom County, Wash., 4 miles east of; at the northeast corner of sec. 3, T. 40 N., R. 1 E., in the southwest angle of the forks of the road; iron post with bronze cap marked "U. S. Geological Survey B. M. 452-B".....	453. 6
Blaine, Whatcom County, Wash., 7 miles east of; at the northwest corner of sec. 5, T. 40 N., R. 2 E., on the south side of the east-and-west road, 1 foot north of the fence and 38 feet east of the center of the north-and-south road between sections 5 and 6; iron post with bronze cap marked "U. S. Geological Survey B. M. 180-B".....	181. 2
Blaine, Whatcom County, Wash., 11 miles east of; about ¼ mile east of the northwest corner of sec. 1, T. 40 N., R. 2 E., in the southwest angle of the forks of the road; iron post with bronze cap marked "U. S. Geological Survey B. M. 124-B".....	125. 3
Northwood, Whatcom County, Wash., 1 mile south and 6½ miles west of Sumas, Wash.; 15 feet north and 30 feet east of the quarter-section corner between secs. 3 and 10, T. 40 N., R. 3 E.; in the southeast angle of the crossroads; iron post with bronze cap marked "U. S. Geological Survey B. M. 132-B".....	133. 5

<sup>1</sup> Precise Levelling in Manitoba (Publication No. 21), Precise Levelling in Saskatchewan (Publication No. 22), Precise Levelling in Alberta (Publication No. 23), and Precise Levelling in British Columbia (Publication No. 24), Geodetic Survey of Canada, 1929 and 1930.

<sup>2</sup> The United States Coast and Geodetic Survey has leveled on this bench mark and has designated it "H-6" in their bulletins.

	Elevation (feet)
Clearbrook, Whatcom County, Wash., on the Bellingham & Northern R. R., 3 miles southwest of Sumas, Wash.; 150 feet southeast of the railway station; in the northeast angle of the highway and railway crossing; iron post with bronze cap marked "U. S. Geological Survey B. M. 66-B".....	67. 5
International Boundary Monument 31, 9.8 feet east of; at Sumas, Whatcom County, Wash.; Huntingdon, Fraser Valley District, B. C.; a bronze disk marked "U. S. Geological Survey B. M. 202-B" set in a granite boulder flush with the surface of the ground.....	203. 4
Sumas, Whatcom County, Wash.; 10 feet south of the International Boundary and west of the Seattle & International Railway, at the northeast corner of the United States immigration building (in 1905); iron post with bronze cap marked "U. S. Geological Survey B. M. 48-B".....	49. 0
Lamberton, Whatcom County, Wash., 1¼ miles south and a little east of Sumas, Wash.; at the highway crossing of the Bellingham & Northern Railroad, northeast of the railway station; iron post with bronze cap marked "U. S. Geological Survey B. M. 43-B".....	43. 9
Huntingdon, Fraser Valley District, B. C.; in southeast or front concrete foundation wall of public school, 3 feet 5 inches from the southerly corner and 5 feet 4 inches below the woodwork; Geodetic Survey of Canada first-order bench mark No. 26-J, a copper bolt set horizontally and marked "G. S. C., B. M. 26-J".....	73. 116
International Boundary Monument 32; ½ mile east of the main corners of the village of Huntingdon, Fraser Valley District, B. C., near Sumas, Whatcom County, Wash.; Geodetic Survey of Canada first-order bench mark, a copper bolt marked "G. S. C., B. M. 27-J", set vertically near the north edge of the concrete base.....	<sup>1</sup> 32. 763
Pasayten River crossing of the International Boundary, Okanogan County, Wash., Yale District, B. C., between Monument 85 and Monument 86; 300 feet east of river, 10 feet east of trail, in the boundary vista; iron post with bronze cap marked "U. S. Geological Survey B. M. 3853 T. U. L.".....	<sup>4</sup> 3, 852. 9
Similkameen River valley, Okanogan County, Wash., Yale District, B. C., 0.6 mile south and 0.3 mile east of International Boundary Monument 109, 3 feet east of the highway along the west side of the valley; iron post with bronze cap marked "U. S. Geological Survey B. M. 1197".....	<sup>5</sup> 1, 191. 8
International Boundary Monument 112, 0.3 mile west of; 2 miles east of Similkameen River, Okanogan County, Wash., Yale District, B. C.; iron post with bronze cap marked "U. S. Geological Survey B. M. 1371".....	<sup>6</sup> 1, 367
Oroville, Okanogan County, Wash.; southeast corner of lot at corner of Main and River Streets; iron post with bronze cap marked "U. S. Geological Survey B. M. 928-T"; it is also a U. S. Coast and Geodetic Survey first-order bench mark.....	918. 077
International Boundary Monument 118, 2 feet south of; Okanogan County, Wash., Yale District, B. C.; iron post with bronze cap marked "U. S. Geological Survey B. M. 1058-T".....	<sup>1</sup> 1, 047. 9
Molson, Okanogan County, Wash., about 1.8 miles northeast of; 945 feet south of the International Boundary Line, 21 feet west of the Great Northern Railway track, 102 feet north of a road crossing, and 50 feet east of the fence line; United States Coast and Geodetic Survey first-order bench mark, a bronze disk set in the top of a concrete post and marked "U. S. Coast & Geodetic Survey bench mark X-22".....	3, 582. 724
Bridesville, Yale District, B. C.; ¼ mile southwest of the railway station, in a small rock cut on the Great Northern Railway, 66 feet south of the 15th telegraph pole south of milepost 93 from Marcus; Geodetic Survey of Canada first-order bench mark, a bronze disk set horizontally in the west side of the rock cut 1 foot above the track level and marked "Geodetic Survey of Canada B. M. 857-J".....	3, 449. 826

<sup>1</sup> This bench mark was disturbed by repairs made to the monument in 1922. The elevation given has been corrected for the change in elevation.

<sup>4</sup> This elevation was determined by the United States Geological Survey, Bulletin No. 674, 1918. There are at present no data available for referring this elevation to the 1929 datum of the Geodetic Survey of Canada.

<sup>5</sup> On an unchecked spur line.

<sup>6</sup> Elevation approximate.

	Elevation (feet)
Bridesville, Yale District, B. C.; 3 miles south of the railway station, in a small rock cut on the Great Northern Railway, 142 feet south of the 14th telegraph pole north of milepost 96 from Marcus and 417 feet north of the International Boundary; Geodetic Survey of Canada first-order bench mark, a bronze disk set horizontally in the west side of the cut and marked "Geodetic Survey of Canada B. M. 858-J"-----	3, 572. 311
Bridesville, Yale District, B. C.; 3 miles south of the railway station, 47 feet west of Great Northern Railway track, 41 feet south of 14th telegraph pole north of milepost 96 from Marcus, and 237 feet north of the International Boundary Line; Geodetic Survey of Canada first-order bench mark, an iron pipe with bronze cap, set in the ground, and marked "Geodetic Survey of Canada B. M. 859-J"-----	3, 584. 873
International Boundary Monument 132, 0.2 mile west of; Okanogan County, Wash., Yale District, B. C.; 600 feet west of Myers Creek, and on the east side of the highway; iron post with bronze cap marked "U. S. Geological Survey B. M. 2631-T"-----	2, 621. 7
Midway, Yale District, B. C.; 5 miles west of Canadian Pacific Railway station; in top of north concrete pier near west or upstream end of highway bridge over Kettle River; Geodetic Survey of Canada first-order bench mark, a bronze disk marked "Geodetic Survey of Canada B. M. 423-J"-----	1, 929. 036
Midway, Yale District, B. C.; at milepost 2 west of Canadian Pacific Railway station; 50 feet east of a private crossing and 3 feet north of the southerly limit of the railway right-of-way; Geodetic Survey of Canada first-order bench mark, a bronze disk set in the top of a concrete pier and marked "Geodetic Survey of Canada B. M. 424-J"-----	1, 910. 863
International Boundary Monument 142, Yale District, B. C., Ferry County, Wash.; Geodetic Survey of Canada first-order bench mark, a bronze disk in top of and near the north edge of the concrete base of the monument, marked "Geodetic Survey of Canada B. M. 425-J"-----	1, 997. 569
Midway, Yale District, B. C.; ¼ mile east of Canadian Pacific Railway station; 160 feet east of milepost 126 from Nelson, and 500 feet west of a road crossing, in the center of the north face of a tile pipe culvert under the Canadian Pacific Railway; Geodetic Survey of Canada first-order bench mark, a bronze disk marked "Geodetic Survey of Canada B. M. 426-J"-----	1, 915. 222
Midway, Yale District, B. C., 2¼ miles northeast of; 40 feet north of the Canadian Pacific Railway track, beside a water course at mileage 123.9 from Nelson; Geodetic Survey of Canada first-order bench mark, a bronze disk set in the south face of a rock ledge, and marked "Geodetic Survey of Canada B. M. 427-J"-----	2, 095. 308
International Boundary Monument 155, at Carson, Yale District, B. C., and near Danville, Ferry County, Wash.; about 300 feet west of the Great Northern Railway; Geodetic Survey of Canada first-order bench mark, a bronze disk set in the top of the concrete base near the north edge and marked "Geodetic Survey of Canada B. M. 442-J"-----	1, 733. 537
Danville, Ferry County, Wash., about 2 miles east by northeast of; on the Great Northern Railway, directly south of Grand Forks, 0.4 mile north of the International Boundary, 0.5 mile west of the spur track to Grand Forks, on the south side of the track, 20 feet from the south rail; in the top of the granite post 10 by 10 by 48 inches set 36 inches in the ground to mark "Danville west base" triangulation station; bronze bench-mark disk set beside the copper bolt which marks the triangulation station-----	1, 751
Danville, Ferry County, Wash., about 3 miles east by northeast of; on the Great Northern Railway, directly south of Grand Forks, 0.4 mile north of the International Boundary, 0.6 mile east of the spur track to Grand Forks, on the south side of the track, 20 feet from the south rail; in the top of the granite post 10 by 10 by 48 inches set 36 inches in the ground to mark "Danville east base" triangulation station; bronze bench-mark disk set beside the copper bolt which marks the triangulation station-----	1, 733
Grand Forks, Yale District, B. C.; in the west foundation wall of the post office, 12 feet from the southwest corner and 2 feet 7 inches below the brickwork; Geodetic Survey of Canada first-order bench mark, a bronze disk marked "Geodetic Survey of Canada B. M. 440-J"-----	1, 691. 391
Grand Forks, Yale District, B. C.; in the concrete foundation of the east wall of the courthouse, 45 feet from the northeast corner and 5 feet below the brickwork; Geodetic Survey of Canada first-order bench mark, a bronze disk marked "Geodetic Survey of Canada B. M. 441-J"-----	1, 689. 694

	Elevation (feet)
Grand Forks, Yale District, B. C.; on the abutment of the railway bridge over Kettle River, $\frac{1}{4}$ mile east of the Canadian Pacific Railway station, at milepost 94 from Nelson; in the north end of the east face of the west concrete abutment, 6 feet above the bridge seat; Geodetic Survey of Canada first-order bench mark, a bronze disk marked "Geodetic Survey of Canada B. M. 439-J"-----	1, 699. 385
Grand Forks, Yale District, B. C.; in retaining wall of railway bridge over Kettle River, $2\frac{1}{2}$ miles east of the Canadian Pacific Railway station, at mileage 92.3 from Nelson; in the north stone wall at the east end of the bridge; in top of first stone east of the abutment; Geodetic Survey of Canada first-order bench mark, a bronze disk marked "Geodetic Survey of Canada B. M. 443-J"-----	1, 695. 307
Gilpin, Yale District, B. C., $1\frac{1}{2}$ miles west of the west switch; at mileage 88.8 from Nelson, on the Canadian Pacific Railway, at a highway bridge over the track; in the center of the south face of the north abutment, about 1 foot above the track level; Geodetic Survey of Canada first-order bench mark, a bronze disk marked "Geodetic Survey of Canada B. M. 444-J"-----	1, 726. 374
Gilpin, Yale District, B. C., 1 mile east of the east switch; 240 feet east of milepost 86 from Nelson, on the Canadian Pacific Railway, 500 feet east of a road crossing and 3 feet north of the southerly limit of the railway right-of-way; Geodetic Survey of Canada first-order bench mark, a bronze disk set in the top of a concrete bench-mark pier and marked "Geodetic Survey of Canada B. M. 445-J"-----	1, 669. 312
Billings, Yale District, B. C., $\frac{1}{2}$ mile west of the Canadian Pacific Railway station; at mileage 83.4 from Nelson, 600 feet west of a road crossing, at a rocky point touched by the railway; Geodetic Survey of Canada first-order bench mark, a bronze disk set in the south face of the rock and marked "Geodetic Survey of Canada B. M. 446-J"-----	1, 658. 461
Cascade, Yale District, B. C., $\frac{1}{4}$ mile west of the Canadian Pacific Railway station; at mileage 82.7 from Nelson; in the stone ballast wall on top of the east abutment of the railway bridge over Kettle River; Geodetic Survey of Canada first-order bench mark, a bronze disk set in the top of the wall near the north end and marked "Geodetic Survey of Canada B. M. 447-J"-----	1, 641. 882
Cascade, Yale District, B. C., $\frac{1}{4}$ mile east of the Canadian Pacific Railway station; at mileage 81.1 from Nelson; in the south face of the east abutment, above the bridge seat, of the bridge over Kettle River; Geodetic Survey of Canada first-order bench mark, a bronze disk marked "Geodetic Survey of Canada B. M. 448-J"-----	1, 537. 588
International Boundary Monument 165, 210 feet west of; at Laurier, Ferry County, Wash., and near Cascade, Yale District, B. C.; Geodetic Survey of Canada first-order bench mark, an iron pipe with a bronze cap set in the ground and marked "Geodetic Survey of Canada B. M. 860-J"-----	1, 649. 890
Laurier, Ferry County, Wash., Cascade, Yale District, B. C.; in a mass of rock 150 feet north of the International Boundary and 250 feet westerly from the Great Northern Railway track, at the road crossing immediately north of the Canadian customs office; Geodetic Survey of Canada first-order bench mark, a bronze disk set vertically in the top of the rock, near the highest point, and marked "Geodetic Survey of Canada B. M. 861-J"-----	1, 677. 195
International Boundary Monument 165, 3 feet south of; at Laurier, Ferry County, Wash.; between the Great Northern Railway and the Canadian customs office; United States Coast and Geodetic Survey first-order bench mark, a bronze disk set in the top of a concrete post and marked "U. S. Coast & Geodetic Survey bench mark Y-22, 1931"-----	1, 646. 674
International Boundary Monument 181, 5 feet east of; at Boundary, Stevens County, Wash., Waneta, Kootenay West District, B. C.; on the east bank of the Columbia River, 60 feet west of the Great Northern Railway track; iron post with bronze cap marked "U. S. Geological Survey B. M. 1356"; it is also a bench mark of the Geodetic Survey of Canada-----	1, 348. 75
Waneta, Kootenay West District, B. C.; in abutment of Great Northern Railway bridge over Clark Fork (Pend-d'Oreille) River, about 600 feet south of the railway station; Geodetic Survey of Canada bench mark, a bronze disk set vertically in the bridge seat of the north abutment, near the southeast corner and marked "Geodetic Survey of Canada B. M. 19-T"-----	1, 348. 14
International Boundary Monument 188-A, 25 feet west of; at Nelway, Kootenay West District, B. C., 13 miles north of Metaline Falls, Wash.; on the west side of the Spokane-Nelson highway; a bronze disk set in the top of a concrete post and marked "U. S. Geological Survey B. M. R-55, 1930"; it is also Geodetic Survey of Canada bench mark R-55-----	2, 558. 40

<sup>7</sup> The United States Coast and Geodetic Survey has leveled on this bench mark.

Nelway, Kootenay West District, B. C.; $\frac{1}{4}$ mile northwest of the Canadian customhouse; 24 feet north of the center line of the Waneta-Nelway road, $\frac{1}{4}$ mile west of the junction of a branch road, and 12 feet east of a fence extending from the road to the shore of a small lake; Geodetic Survey of Canada bench mark, an iron pipe with bronze cap marked "Geodetic Survey of Canada B. M. 27-T"-----	Elevation (feet)  2, 529. 27
<b>THE IDAHO-BRITISH COLUMBIA LINE</b>	
Creston, Kootenay East District, B. C.; at the southeast corner of the "Creston House", the hotel property of S. J. Miller in 1904; United States Geological Survey bench mark, an iron post with bronze cap stamped "UNITED STATES BENCH MARK"-----	1, 957. 0
Creston, Kootenay East District, B. C., about 3 miles south of; 3.3 miles north of Porthill, Boundary County, Idaho; on the east edge of the right-of-way of the abandoned Great Northern Railway, 30 feet east of milepost 29, and near the south end of trestle No. 14; United States Geological Survey bench mark, an iron post with bronze cap stamped "UNITED STATES BENCH MARK"-----	1, 800. 5
Porthill, Boundary County, Idaho, $3\frac{1}{2}$ miles north of; in a rock cut on the abandoned Great Northern Railway, 780 feet north of a trestle; Geodetic Survey of Canada first-order bench mark, a copper bolt set horizontally in the east side of the rock cut near the south end, and marked "G. S. C. B. M. 197-D"-----	1, 798. 408
International Boundary Monument 207, at Porthill, Boundary County, Idaho; immediately east of the abandoned Great Northern Railway; Geodetic Survey of Canada first-order bench mark, a copper bolt set horizontally in the north face of the concrete base of the monument and marked "G. S. C. B. M. 198-D"-----	* 1, 793. 5
International Boundary Monument 207, 4 feet west of; at Porthill, Boundary County, Idaho; United States Geological Survey bench mark, an iron post with bronze cap stamped "UNITED STATES BENCH MARK, Elev. 1794.124 feet." This is also United States Coast and Geodetic Survey first-order bench mark V-10-----	* 1, 793. 954
Porthill, Boundary County, Idaho, 2.8 miles south of; 38 feet east of the east rail of the Great Northern Railway track, 157 feet north of the north end of trestle No. 10, and at a fence line near an old gate; United States Geological Survey bench mark, an iron post with bronze cap stamped "UNITED STATES BENCH MARK, Elevation 1780.656 feet". This is also United States Coast and Geodetic Survey first-order bench mark U-10-----	1, 780. 486
<b>THE MONTANA-BRITISH COLUMBIA LINE</b>	
International Boundary Monument 233, Lincoln County, Mont., Kootenay East District, B. C.; on the east side of North Fork of Yaak River, 0.2 mile west of the trail; United States Geological Survey bench mark, a nail driven into the concrete on the south side of the base of the monument-----	3, 236. 2
Gateway, Lincoln County, Mont.; 90 feet west of the United States customhouse, on the International Boundary Line; United States Geological Survey bench mark, an iron post with bronze cap stamped "2355"-----	2, 363. 4
Gateway, Lincoln County, Mont.; 0.2 mile south of the International Boundary Line, 119 feet west of the west rail of the Great Northern Railway, in the top of the square granite post which marks triangulation station "Gateway north base"; a bronze disk stamped "2371"-----	2, 378. 9
Gateway, Lincoln County, Mont., 1.2 miles south of; 119 feet west of the west rail of the Great Northern Railway in a rather deep cut, and about 115 feet north of an old house; in the top of the square granite post which marks triangulation station "Gateway south base"; a bronze disk stamped "2362 feet, datum G. N."-----	2, 370. 7
Flathead River valley, Flathead County, Mont.; 2.5 miles south of the International Boundary, on the east side of the Flathead River, in the northwest quarter of sec. 23, T. 37 N., R. 22 W., 10 feet north of the junction of the Flathead River trail and the Kishenehn trail as located in 1903; United States Geological Survey bench mark, an iron post with bronze cap stamped "3886"-----	3, 895. 4
International Boundary Monument 262, 15 feet west of; in the Flathead River valley, Flathead County, Mont., Kootenay East District, B. C.; 0.5 mile east of the Flathead River, 0.3 mile west of Sage Creek; United States Geological Survey bench mark, an iron post with bronze cap stamped "4068"-----	4, 077. 7

\* This bench mark was slightly disturbed in 1930 and the elevation is now only approximate.

\* The Geodetic Survey of Canada has leveled on this bench mark.

## THE MONTANA-ALBERTA LINE

	Elevation (feet)
Babb, Glacier County, Mont., about 5 miles north and a little east of; about 5 miles south of the International Boundary Line, in sec. 36, T. 37 N., R. 14 W., near the road and irrigation canal, about 0.4 mile northeast of Powell's ranch and about 0.4 mile east of a ford; iron post with bronze cap stamped "4467 G. N."-----	<sup>10</sup> 4, 476. 4
Babb, Glacier County, Mont., about 6 miles northeast of; about 4 miles south of the International Boundary, in sec. 30, T. 37 N., R. 13 W., 1 mile west of Spider Lake, 20 feet north of the road; iron post with bronze cap stamped "4473 G. N."-----	<sup>10</sup> 4, 482. 2
Babb, Glacier County, Mont., about 7 miles northeast of; 3 miles south of the International Boundary, near the northeast corner of sec. 23, T. 37 N., R. 13 W., 1 mile east of Spider Lake, on a bluff on the south side of a ravine, about 800 feet south of a road; iron post with bronze cap stamped "4462 G. N."-----	<sup>10</sup> 4, 471. 8
Babb, Glacier County, Mont., about 12 miles northeast of; in sec. 19, T. 37 N., R. 12 W., 1.5 miles southwest of Galbreath's ranch, 100 feet east of the road; iron post with bronze cap stamped "4493 G. N."-----	<sup>10</sup> 4, 502. 7
Babb, Glacier County, Mont., about 10 miles northeast of; about 5 miles south of the International Boundary, on the highest point of the east end of the ridge between Galbreath Basin and the North Fork of Milk River, near the quarter-section corner on the south side of sec. 25, T. 37 N., R. 13 W.; "Galbreath" triangulation station, an aluminum bolt stamped "5196 G. N." set in a large granite boulder, which is flush with the surface of the ground-----	<sup>11</sup> 5, 205. 6
Babb, Glacier County, Mont., about 12 miles northeast of; in sec. 32, T. 37 N., R. 12 W., at Hall's ranch, in the yard, 15 feet south of the house; iron post with bronze cap stamped "4565 G. N."-----	<sup>12</sup> 4, 574. 6
Babb, Glacier County, Mont., about 16 miles northeast of; in sec. 21, T. 37 N., R. 12 W., about 3 miles south of the International Boundary, about 2 miles southeast of Galbreath's ranch, about 2 miles south of a group of small lakes; iron post with bronze cap stamped "4452 G. N."-----	<sup>10</sup> 4, 461. 6
Babb, Glacier County, Mont., about 14 miles northeast of; 1½ miles south of the International Boundary, in sec. 7, T. 37 N., R. 12 W., at Galbreath's ranch, in the yard in front of the house; iron post with bronze cap stamped "4284"-----	4, 285. 0
Emigrant Gap, Hudson Bay Divide, Glacier County, Mont.; 1½ miles south of the International Boundary; in the northwest quarter of sec. 8, T. 37 N., R. 11 W., 60 feet east of the road; iron post with bronze disk stamped "4473 G. N."-----	<sup>10</sup> 4, 482. 2
North Fork of Milk River, Glacier County, Mont., 0.7 mile south of; in northeast quarter of sec. 21, T. 37 N., R. 11 W., 30 feet east of the McLeod road; iron post with bronze disk stamped "4436 G. N."-----	<sup>10</sup> 4, 445. 5
International Boundary Monument 288, 2 miles south of; Glacier County, Mont.; 0.5 mile northeast of Smith's ranch house, 0.3 mile east of a small lake, 60 feet from an old road, on the uphill side; iron post with bronze cap marked "U. S. & C. B. Survey, 4569"-----	4, 570. 2
International Boundary Monument 288, 10 feet west of; Glacier County, Mont., Lethbridge District, Alberta; iron post with bronze cap marked "U. S. & C. B. Survey, 4615"-----	4, 616. 2
International Boundary Monument 289, 10 feet west of; Glacier County, Mont., Lethbridge District, Alberta; iron post with bronze cap marked "U. S. & C. B. Survey, 4722"-----	4, 722. 9
International Boundary Monument 290, in base of; Glacier County, Mont., Lethbridge District, Alberta; bronze disk marked "U. S. & C. B. Survey B. M."-----	4, 499. 5
International Boundary Monument 291, 45 feet west of; Glacier County, Mont., Lethbridge District, Alberta; bronze disk set in solid rock and stamped "4430"-----	4, 431. 2

<sup>10</sup> Established by the United States Reclamation Service.<sup>11</sup> On a spur line; not checked. Established by the United States Reclamation Service.<sup>12</sup> On a spur line. Established by the United States Reclamation Service.



	Elevation (feet)
International Boundary Monument 293, 10 feet west of; Glacier County, Mont., Lethbridge District, Alberta; iron post with bronze cap marked "U. S. & C. B. Survey, 4409"-----	4, 410. 3
International Boundary Monument 294, 0.6 mile east of; Glacier County, Mont., Lethbridge District, Alberta; township corner between ranges 12 and 13 west, of the United States public lands survey; iron post with bronze cap stamped "4429"-----	4, 430. 2
International Boundary Monument 295, 10 feet west of; Glacier County, Mont., Lethbridge District, Alberta; iron post with bronze cap marked "U. S. & C. B. Survey, 4678"-----	4, 679. 3
International Boundary Monument 298, 10 feet west of; Glacier County, Mont., Lethbridge District, Alberta; iron post with bronze cap marked "U. S. & C. B. Survey, 4220"-----	4, 220. 8
International Boundary Monument 298, 1.2 miles east of; Glacier County, Mont., Lethbridge District, Alberta; on the range line between ranges 11 and 12 west, of the United States public lands survey; iron section corner post with bronze cap stamped "4288"-----	4, 289. 3
International Boundary Monument 300, 10 feet west of; Glacier County, Mont., Lethbridge District, Alberta; iron post with bronze cap marked "U. S. & C. B. Survey, 4628"-----	4, 629. 4
International Boundary Monument 301; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 4416"-----	4, 416. 8
International Boundary Monument 302, 10 feet west of; Glacier County, Mont., Lethbridge District, Alberta; iron post with bronze cap marked "U. S. & C. B. Survey, 4296"-----	4, 297. 2
International Boundary Monument 302, ¼ mile east of; Glacier County, Mont., Lethbridge District, Alberta; township corner between ranges 10 and 11 west, of the United States public lands survey; iron post with bronze cap stamped "4305"-----	4, 305. 7
International Boundary Monument 303; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 4511"-----	4, 511. 9
International Boundary Monument 304; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 4490"-----	4, 491. 2
International Boundary Monument 305; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 4484"-----	4, 484. 9
International Boundary Monument 306; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 4446"-----	4, 447. 2
International Boundary Monument 306, 800 feet east of; Glacier County, Mont., Lethbridge District, Alberta; township corner between ranges 9 and 10 west, of the United States public lands survey; iron post with bronze cap stamped "4429"-----	4, 430. 3
International Boundary Monument 307; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the base of the monument; bronze disk marked "U. S. & C. B. Survey, 4367"-----	4, 368. 3
International Boundary Monument 308; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 4338"-----	4, 338. 6
International Boundary Monument 309; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 4347"-----	4, 348. 2
International Boundary Monument 310; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 4121"-----	4, 121. 6
International Boundary Monument 310, ¼ mile east of; township corner between ranges 8 and 9 west, of the United States public lands survey; iron post with bronze cap stamped "4057"-----	4, 058. 2

	Elevation (feet)
International Boundary Monument 311; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 4057"-----	4, 057. 5
International Boundary Monument 312; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 4005"-----	4, 005. 9
International Boundary Monument 313; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 4051"-----	4, 051. 7
International Boundary Monument 314; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 3983"-----	3, 984. 1
International Boundary Monument 314, ¼ mile east of; Glacier County, Mont., Lethbridge District, Alberta; township corner between ranges 7 and 8 west, of the United States public lands survey; iron post with bronze cap stamped "3949"-----	3, 949. 7
International Boundary Monument 315; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 3923"-----	3, 924. 1
International Boundary Monument 316; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 3964"-----	3, 964. 7
International Boundary Monument 317; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 4026"-----	4, 026. 7
International Boundary Monument 318; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 4024"-----	4, 024. 1
International Boundary Monument 318, ¼ mile east of; Glacier County, Mont., Lethbridge District, Alberta; township corner between ranges 6 and 7 west, of the United States public lands survey; iron post with bronze cap stamped "4003"-----	4, 003. 9
International Boundary Monument 319; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 4025"-----	4, 026. 1
International Boundary Monument 320; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 4407"-----	4, 407. 2
International Boundary Monument 321; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 4282"-----	4, 282. 3
International Boundary Monument 322; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 4282"-----	4, 282. 2
International Boundary Monument 323; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 4069"-----	4, 069. 5
International Boundary Monument 324; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 3963"-----	3, 963. 0
International Boundary Monument 325; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 3899"-----	3, 899. 4

	Elevation (feet)
International Boundary Monument 326; Glacier County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 3763"-----	3, 763. 0
International Boundary Monument 327; Toole County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 3634"-----	3, 634. 2
International Boundary Monument 328; Toole County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 3663"-----	3, 663. 4
International Boundary Monument 329; Toole County, Mont., Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 3648"-----	3, 648. 4
International Boundary Monument 330; 4.8 miles west of Sweetgrass, Toole County, Mont., and Coutts, Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze triangulation disk marked "U. S. & C. B. Survey, 3587"-----	3, 587. 1
International Boundary Monument 331; 2.9 miles west of Sweetgrass, Toole County, Mont., and Coutts, Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey, 3571"-----	3, 571. 0
International Boundary Monument 332; 1.6 miles west of Sweetgrass, Toole County, Mont., and Coutts, Lethbridge District, Alberta; in the south side of the top of the concrete base of the monument; bronze triangulation disk marked "U. S. & C. B. Survey, 3495"-----	3, 495. 1
International Boundary Monument 333; at Sweetgrass, Toole County, Mont., and Coutts, Lethbridge District, Alberta; ½ mile west of the Great Northern Railway tracks, at a point on the concrete base 4 inches north of the monument shaft-----	3, 550. 7
International Boundary Monument 334, at Sweetgrass, Toole County, Mont., and Coutts, Lethbridge District, Alberta; 80 feet east of the Great Northern Railway tracks; iron post with bronze cap set in the concrete base of the monument and marked "U. S. & C. B. Survey, 3466". It is also United States Coast and Geodetic Survey first-order bench mark H-12, and a first-order bench mark of the Geodetic Survey of Canada-----	3, 466. 666
Coutts, Lethbridge District, Alberta; in a concrete pier (built originally for astronomic observations) 240 feet west of the Canadian Pacific Railway track, 1,050 feet north of the International Boundary and 150 feet south of Coutts post office; Geodetic Survey of Canada first-order bench mark 216-C, a copper bolt set horizontally in the north face of the pier-----	3, 491. 061
International Boundary Monument 335; ¾ mile east of Sweetgrass, Toole County, Mont., and Coutts, Lethbridge District, Alberta; in the north side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 3553"-----	3, 552. 1
International Boundary Monument 336; 2 miles east of Sweetgrass, Toole County, Mont., and Coutts, Lethbridge District, Alberta; in the north side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 3602"-----	3, 601. 0
International Boundary Monument 337; 3 miles east of Sweetgrass, Toole County, Mont., and Coutts, Lethbridge District, Alberta; in the north side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 3513"-----	3, 512. 2
International Boundary Monument 376, 1 mile east of; Hill County, Mont., in sec. 6, T. 37 N., R. 9 E.; a short distance south of the International Boundary Line, near the mouth of Kennedy's (or Canada) Coulee, 600 feet north of a log cabin, and 80 feet south of a ditch on the south side of Milk River; iron post with bronze cap marked "U. S. Geological Survey B. M. 2713 HAVRE" <sup>13</sup> -----	2, 712. 5
THE MONTANA-SASKATCHEWAN LINE	
International Boundary Monument 396, 1,900 feet west of; Hill County, Mont.; 3 feet south of the township corner between ranges 13 and 14 east, of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., 2821"-----	2, 822. 2

<sup>13</sup> This bench mark is at the end of a 10-mile single-run spur line.

	Elevation (feet)
International Boundary Monument 398, about 1,900 feet west of; Hill County, Mont., Maple Creek District, Sask.; on the north line of sec. 4, T. 37 N., R. 14 E., of the United States public lands survey; on top of a hill 700 feet north of a coulee which runs northwest and southeast; iron post with bronze cap marked "U. S. Geological Survey B. M., 2835"-----	2, 835. 7
International Boundary Monument 400, about 3,400 feet west of; Hill County, Mont., Maple Creek District, Sask.; 750 feet west of the northeast corner of sec. 1, T. 37 N., R. 14 E., of the United States public lands survey, and about 0.4 mile northeast of a deep coulee; iron post with bronze cap marked "U. S. Geological Survey B. M., 2849"-----	2, 850. 0
International Boundary Monument 402, 1,300 feet east of; Hill County, Mont., Maple Creek District, Sask.; 650 feet east of the northwest corner of sec. 3, T. 37 N., R. 15 E., of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., 2781"-----	2, 781. 8
International Boundary Monument 403, 6 feet north of; Maple Creek District, Sask.; bolt in concrete block flush with ground, marked "C. 1908 B. M. 2738". Bench mark set by International Boundary Commission; elevation determined by United States Geological Survey-----	2, 752. 8
International Boundary Monument 403, about 1 mile south of; Hill County, Mont.; near the northeast corner of sec. 11, T. 37 N., R. 15 E.; about 600 feet south of a small coulee on the west side of Lodge Creek (West Fork Creek); iron post with bronze cap marked "U. S. Geological Survey B. M., 2745"-----	2, 746. 2
International Boundary Monument 403, 1.13 miles east of; Hill County, Mont., Maple Creek District, Sask.; 1 mile east of Lodge Creek (West Fork Creek), 400 feet west of the northeast corner of sec. 1, T. 37 N., R. 15 E., of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., 2783"-----	2, 784. 1
International Boundary Monument 406, 6 inches south of; Hill County, Mont.; iron post with bronze cap marked "U. S. Geological Survey B. M., 2812"-----	2, 812. 5
International Boundary Monument 408, 1,840 feet west of; Hill County, Mont., Maple Creek District, Sask.; at the northwest corner of sec. 6, T. 37 N., R. 17 E., of the United States public lands survey; on the ridge between Woodpile Coulee a half mile to the east and another coulee a half mile to the west; iron post with bronze cap marked "U. S. Geological Survey B. M., 2824"....	2, 824. 6
International Boundary Monument 410, 936 feet east of; Hill County, Mont.; 6 feet south of the northeast corner of sec. 4, T. 37 N., R. 17 E., of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., 2876"-----	2, 876. 3
International Boundary Monument 413, 700 feet west of; Blaine County, Mont., 40 feet south of the township corner between ranges 17 and 18 east, of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., 2803"-----	2, 801. 8
International Boundary Monument 415, 1,750 feet east of; Blaine County, Mont., Maple Creek District, Sask.; 70 feet west of the northeast corner of sec. 4, T. 37 N., R. 18 E., of the United States public lands survey, near a small lake bed; iron post with bronze cap marked "U. S. Geological Survey B. M., 2885"-----	2 883. 7
International Boundary Monument 417, 10 feet south of; Blaine County, Mont.; 2,550 feet west of the northeast corner of sec. 1, T. 37 N., R. 18 E., of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., 2894"-----	2, 893. 1
International Boundary Monument 418, 10 feet south of; Blaine County, Mont.; 0.6 mile east of the township corner between ranges 18 and 19 east, of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., 2909"-----	2, 908. 2
International Boundary Monument 420, 1,600 feet west of; Blaine County, Mont., Maple Creek District, Sask.; about 0.6 mile east of East Fork of Milk River; about 1,900 feet east of northwest corner of sec. 3, T. 37 N., R. 19 E., of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., 2844"-----	2, 845. 4

	Elevation (feet)
International Boundary Monument 420, beside; Blaine County, Mont., Maple Creek District, Sask.; 1,780 feet west of the northeast corner of sec. 3, T. 37 N., R. 19 E., of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., 2859"----	2, 859. 6
International Boundary Monument 421, 1,340 feet east of; Blaine County, Mont., Maple Creek District, Sask.; 1,125 feet west of the northeast corner of sec. 2, T. 37 N., R. 19 E., of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., 2844"-----	2, 844. 7
International Boundary Monument 423; Blaine County, Mont., Maple Creek District, Sask.; 1,640 feet east of the northwest corner of sec. 5, T. 37 N., R. 20 E., of the United States public lands survey; the southwest corner of the boundary monument-----	2, 795. 3
International Boundary Monument 423, about 2,000 feet east of; Blaine County, Mont., about 1,700 feet west of the northeast corner of sec. 5, T. 37 N., R. 20 E., of the United States public lands survey; 60 feet south of the Canadian section corner between sections 2 and 3, T. 1, R. 24 W., III meridian; iron post with bronze cap marked "U. S. Geological Survey B. M., 2790"-----	2, 791. 0
International Boundary Monument 424; Blaine County, Mont., Maple Creek District, Sask.; 400 feet east of the northeast corner of sec. 4, T. 37 N., R. 20 E., of the United States public lands survey; the southwest corner of the boundary monument-----	2, 815. 8
International Boundary Monument 425, 6 feet south of; Blaine County, Mont.; 1,445 feet west of the northeast corner of sec. 2, T. 37 N., R. 20 E., of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., 2883"-----	2, 883. 7
International Boundary Monument 427, about 2,000 feet east of; Blaine County, Mont.; about 1,200 feet west of the northeast corner of sec. 5, T. 37 N., R. 21 E., of the United States public lands survey; 80 feet south of the Canadian section corner between sections 2 and 3, T. 1, R. 23 W., III meridian; at the north edge of a coulee; iron post with bronze cap marked "U. S. Geological Survey B. M., 3106"-----	3, 106. 7
International Boundary Monument 429; Blaine County, Mont., Maple Creek District, Sask.; about 2,280 feet east of the northwest corner of sec. 2, T. 37 N., R. 21 E., of the United States public lands survey; the southwest corner of the boundary monument-----	3, 379. 9
International Boundary Monument 429, 2,025 feet east of; Blaine County, Mont.; 974 feet west of the northeast corner of sec. 2, T. 37 N., R. 21 E., of the United States public lands survey; 70 feet south of the Canadian section corner between secs. 5 and 6, T. 1, R. 22 W., III meridian; iron post with bronze cap marked "U. S. Geological Survey B. M." (elevation not stamped)----	3, 328. 5
International Boundary Monument 435, 1,571 feet west of; Blaine County, Mont., Maple Creek District, Sask.; at the township corner between ranges 22 and 23 east, of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., HAVRE 3162"-----	3, 162. 7
International Boundary Monument 436, beside; Blaine County, Mont., Maple Creek District, Sask.; stone painted "3007"-----	3, 007. 7
International Boundary Monument 437, 1,780 feet west of; Blaine County, Mont., Maple Creek District, Sask.; at the northeast corner of sec. 4, T. 37 N., R. 23 E., of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., HAVRE 3016"-----	3, 016. 5
International Boundary Monument 439, 1,650 feet west of; Blaine County, Mont., Maple Creek District, Sask.; at the township corner between ranges 23 and 24 east, of the United States public lands survey; at the north edge of a small intermittent lake; iron post with bronze cap marked "U. S. Geological Survey B. M., HAVRE 3072"-----	3, 071. 8
International Boundary Monument 441, 1,900 feet west of; Blaine County, Mont., Maple Creek District, Sask.; about 550 feet east of the northeast corner of sec. 3, T. 37 N., R. 24 E., of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., HAVRE 3045"-----	3, 044. 2
International Boundary Monument 442, 580 feet east of; Blaine County, Mont., Maple Creek District, Sask.; about 215 feet east of the northwest corner of sec. 1, T. 37 N., R. 24 E., of the United States public lands survey; iron post with bronze cap marked "U. S. Geological Survey B. M., HAVRE 3045"-----	3, 044. 5

	Elevation (feet)
International Boundary Monument 477; Phillips County, Mont., Maple Creek District, Sask.; the southeast corner of the boundary monument.....	2, 651. 5
International Boundary Monument 478; Phillips County, Mont., Maple Creek District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2724".....	2, 717. 0
International Boundary Monument 479; Phillips County, Mont., Maple Creek District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2797".....	2, 790. 3
International Boundary Monument 480; Phillips County, Mont., Maple Creek District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2758".....	2, 752. 5
International Boundary Monument 481; Phillips County, Mont., Maple Creek District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2532".....	2, 525. 6
International Boundary Monument 482; Phillips County, Mont., Maple Creek District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2484".....	2, 477. 3
International Boundary Monument 483; Phillips County, Mont., Maple Creek District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2614".....	2, 607. 8
International Boundary Monument 484; Phillips County, Mont., Maple Creek District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2997".....	3, 002. 5
International Boundary Monument 485; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2990".....	2, 983. 5
International Boundary Mountain 486; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2980"; it is also a Geodetic Survey of Canada first-order bench mark.....	2, 973. 799
International Boundary Monument 486, 370 feet west of; Valley County, Mont., Wood Mountain District, Sask.; United States Coast and Geodetic Survey first-order bench mark, a bronze disk set in the top of a concrete post and marked "U. S. Coast & Geodetic Survey bench mark U-31".....	2, 969. 676
International Boundary Monument 487; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2832".....	2, 826. 1
International Boundary Monument 488; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2739".....	2, 733. 1
International Boundary Monument 489; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2818".....	2, 811. 2
International Boundary Monument 490; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2729".....	2, 722. 2
International Boundary Monument 491; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2680".....	2, 673. 5
International Boundary Monument 492; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2637".....	2, 631. 0

	Elevation (feet)
International Boundary Monument 493; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2802"-----	2, 795. 6
International Boundary Monument 494; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2681"-----	2, 675. 0
International Boundary Monument 495; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2642"-----	2, 635. 2
International Boundary Monument 496; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2587"-----	2, 580. 7
International Boundary Monument 496, 450 feet south of; Valley County, Mont.; triangulation station "Rock Creek south base"; bronze disk set in concrete and marked "U. S. & C. B. Survey"-----	2, 593. 2
International Boundary Monument 497; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2660"-----	2, 653. 3
International Boundary Monument 498; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2656"-----	2, 649. 8
International Boundary Monument 499; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2706"-----	2, 699. 9
International Boundary Monument 500; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2724"-----	2, 717. 6
International Boundary Monument 501; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2734"-----	2, 727. 2
International Boundary Monument 502; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2883"-----	2, 876. 7
International Boundary Monument 503; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2905"-----	2, 899. 0
International Boundary Monument 504; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 3082"-----	3, 075. 9
International Boundary Monument 505; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 3104"-----	3, 097. 5
International Boundary Monument 506; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 3029"-----	3, 022. 2
International Boundary Monument 507; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 3026"-----	3, 019. 9
International Boundary Monument 508; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2982"-----	2, 975. 2

	Elevation (feet)
International Boundary Monument 509; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2859"-----	2, 852. 0
International Boundary Monument 510; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2971"-----	2, 967. 6
International Boundary Monument 511; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2902"-----	2, 895. 3
International Boundary Monument 512; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2929"-----	2, 922. 8
International Boundary Monument 513; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2996"-----	2, 989. 9
International Boundary Monument 514; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 3178"-----	3, 171. 6
International Boundary Monument 515; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 3048"-----	3, 041. 8
International Boundary Monument 516; Valley County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2992"-----	2, 985. 3
International Boundary Monument 517; Daniels County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 3027"-----	3, 020. 6
International Boundary Monument 518; Daniels County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 3017"-----	3, 010. 7
International Boundary Monument 519; Daniels County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2993"-----	2, 986. 0
International Boundary Monument 520; Daniels County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2966"-----	2, 959. 6
International Boundary Monument 521; Daniels County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2939"-----	2, 932. 1
International Boundary Monument 522; Daniels County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2875"-----	2, 868. 2
International Boundary Monument 523; Daniels County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2856"-----	2, 849. 2
International Boundary Monument 524; Daniels County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2782"-----	2, 774. 9



International Boundary Monument 525; Daniels County, Mont., Wood Mountain District, Sask.; in the south side of the top of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2808"-----	Elevation (feet) 2, 801. 2
International Boundary Monument 526; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2655"-----	2, 649. 8
International Boundary Monument 527; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2572"-----	2, 567. 1
International Boundary Monument 528; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2549"-----	2, 543. 4
International Boundary Monument 529; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2538"-----	2, 533. 0
International Boundary Monument 530; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2607"-----	2, 602. 1
International Boundary Monument 531; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2627"-----	2, 622. 1
International Boundary Monument 532; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2774"-----	2, 768. 3
International Boundary Monument 533; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2809"-----	2, 803. 0
International Boundary Monument 534; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2752"-----	2, 745. 6
International Boundary Monument 535; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2762"-----	2, 755. 7
International Boundary Monument 536; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2557"-----	2, 551. 5
International Boundary Monument 537; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2482"-----	2, 475. 8
International Boundary Monument 538; Daniels County, Mont., Wood Mountain District, Sask.; in the south side of the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2461"-----	2, 455. 2
International Boundary Monument 539; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2473"-----	2, 466. 7
International Boundary Monument 540; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2590"-----	2, 583. 9
International Boundary Monument 541; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2496"-----	2, 492. 8
International Boundary Monument 542; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; iron post with bronze cap marked "U. S. & C. B. Survey B. M., 2527"-----	2, 524. 3
International Boundary Monument 543; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2492"-----	2, 488. 7
International Boundary Monument 544; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2635"-----	2, 631. 9

	Elevation (feet)
International Boundary Monument 545; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2522"----	2, 519. 2
International Boundary Monument 546; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2453"----	2, 449. 6
International Boundary Monument 547; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2622"----	2, 618. 9
International Boundary Monument 548; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2584"----	2, 582. 3
International Boundary Monument 549; Daniels County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2487"----	2, 483. 5
International Boundary Monument 550; Sheridan County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2378"--	2, 373. 9
International Boundary Monument 551; Sheridan County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2397"--	2, 392. 8
International Boundary Monument 552; Sheridan County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2495"--	2, 490. 8
International Boundary Monument 553; Sheridan County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2392"--	2, 388. 1
International Boundary Monument 554; Sheridan County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2478"--	2, 473. 2
International Boundary Monument 555; Sheridan County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2420"--	2, 415. 4
International Boundary Monument 556; Sheridan County, Mont., Wood Mountain District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2422"--	2, 417. 6
International Boundary Monument 557; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2508"--	2, 503. 9
International Boundary Monument 558; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2547"--	2, 542. 9
International Boundary Monument 559; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2540"--	2, 535. 3
International Boundary Monument 560; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2504"--	2, 499. 4
International Boundary Monument 561; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2389"--	2, 384. 4
International Boundary Monument 562; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2431"--	2, 426. 2
International Boundary Monument 563; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2443"--	2, 428. 6
International Boundary Monument 564; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2422"--	2, 416. 1
International Boundary Monument 565; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2401"--	2, 395. 7
International Boundary Monument 566; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2340"--	2, 334. 0

	Elevation (feet)
International Boundary Monument 567; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2317"...	2, 311. 5
International Boundary Monument 568; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2390"...	2, 383. 9
International Boundary Monument 569; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2308"...	2, 302. 4
International Boundary Monument 570; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2350"...	2, 344. 6
International Boundary Monument 571; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2285"...	2, 278. 9
International Boundary Monument 572; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2249"...	2, 243. 1
International Boundary Monument 573; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2256"...	2, 250. 6
International Boundary Monument 574; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2206"...	2, 200. 7
International Boundary Monument 575; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2312"...	2, 306. 3
International Boundary Monument 576; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2326"...	2, 320. 4
International Boundary Monument 577; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2372"...	2, 366. 3
International Boundary Monument 578; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2239"...	2, 233. 0
International Boundary Monument 579; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2357"...	2, 351. 5
International Boundary Monument 580; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2263".....	2, 257. 4
International Boundary Monument 581; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2234".....	2, 228. 5
International Boundary Monument 582; Sheridan County, Mont., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M.".....	2, 244. 1
International Boundary Monument 583; Sheridan County, Mont., Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2181".....	2, 175. 3

## THE NORTH DAKOTA-SASKATCHEWAN LINE

International Boundary Monument 584; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2221".....	2, 214. 7
International Boundary Monument 585; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2140".....	2, 134. 6
International Boundary Monument 586; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M.".....	2, 196. 5
International Boundary Monument 587; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2207".....	2, 201. 4

	Elevation (feet)
International Boundary Monument 588; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2245"-----	2, 238. 8
International Boundary Monument 589; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2326"-----	2, 320. 2
International Boundary Monument 590; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2292"-----	2, 285. 8
International Boundary Monument 591; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2359"-----	2, 352. 7
International Boundary Monument 592; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2337"-----	2, 330. 7
International Boundary Monument 593; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2298"-----	2, 291. 7
International Boundary Monument 594; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2241"-----	2, 235. 4
International Boundary Monument 595; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2202"-----	2, 195. 7
International Boundary Monument 596; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2042"-----	2, 132. 7
International Boundary Monument 597; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2092"-----	2, 083. 3
International Boundary Monument 598; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2062"-----	2, 054. 8
International Boundary Monument 599; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2045"-----	2, 035. 8
International Boundary Monument 600; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2035"-----	2, 025. 4
International Boundary Monument 601; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 2029"-----	2, 019. 6
International Boundary Monument 601, about 0.7 mile south and a little east of; 2½ miles north of Ambrose, Divide County, N. Dak.; on a little knoll on the north side of a coulee; just east of the middle of the west line of sec. 36, T. 164 N., R. 99 W.; iron post with bronze cap, marked "U. S. & C. B. Survey", marking triangulation station "School"-----	2, 038. 5
Ambrose, Divide County, N. Dak.; on the north side of the "Soo" railway, 1,800 feet west of the railway station, 35 feet north of the south rail of the track, and on the first small rise of ground east of a watering pond; bronze disk marked "U. S. & C. B. Survey", set in a block of concrete 12 by 12 inches, marking triangulation station "Ambrose west base"-----	2, 058. 8
International Boundary Monument 602; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1988"-----	1, 979. 2
International Boundary Monument 603; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1964"-----	1, 954. 8
International Boundary Monument 604; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1933"-----	1, 923. 4
International Boundary Monument 605; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1907"-----	1, 897. 6
International Boundary Monument 606; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1929"-----	1, 919. 8

	Elevation (feet)
International Boundary Monument 607; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1922"-----	1, 912. 5
International Boundary Monument 608; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1925"-----	1, 915. 7
International Boundary Monument 609; Divide County, N. Dak., Weyburn District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1919"-----	1, 909. 7
International Boundary Monument 610; Divide County, N. Dak., Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1918"-----	1, 908. 3
International Boundary Monument 611; Divide County, N. Dak., Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1912"-----	1, 903. 2
International Boundary Monument 612; Divide County, N. Dak., Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1910"-----	1, 900. 6
International Boundary Monument 613; Divide County, N. Dak., Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1906"-----	1, 896. 4
International Boundary Monument 614; Divide County, N. Dak., Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1908"-----	1, 898. 4
International Boundary Monument 615; Divide County, N. Dak., Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1908"-----	1, 899. 0
International Boundary Monument 616; Divide County, N. Dak., Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1909"-----	1, 899. 9
International Boundary Monument 617; Divide County, N. Dak., Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1904"-----	1, 894. 3
International Boundary Monument 618; Burke County, N. Dak., Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1920"-----	1, 910. 6
International Boundary Monument 619; Burke County, N. Dak., Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1919"-----	1, 910. 0
International Boundary Monument 620; Burke County, N. Dak., Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M., 1900"-----	1, 891. 0
International Boundary Monument 621; Burke County, N. Dak., Assiniboia District, Sask.; the center of the horizontal letter "I" in the word "UNITED" cast on the south face of the monument shaft-----	1, 902. 8
International Boundary Monument 622; Burke County, N. Dak., Assiniboia District, Sask.; the center of the horizontal letter "I" in the word "UNITED" cast on the south face of the monument shaft-----	1, 897. 7
International Boundary Monument 623; Burke County, N. Dak., Assiniboia District, Sask.; the center of the horizontal letter "I" in the word "UNITED" cast on the south face of the monument shaft-----	1, 906. 2
International Boundary Monument 624; Burke County, N. Dak., Assiniboia District, Sask.; the center of the horizontal letter "I" in the word "UNITED" cast on the south face of the monument shaft-----	1, 921. 9
International Boundary Monument 625; Burke County, N. Dak., Assiniboia District, Sask.; the center of the horizontal letter "I" in the word "UNITED" cast on the south face of the monument shaft-----	1, 962. 1
International Boundary Monument 626; Burke County, N. Dak., Assiniboia District, Sask.; the center of the horizontal letter "I" in the word "UNITED" cast on the south face of the monument shaft-----	1, 963. 9

	Elevation (feet)
International Boundary Monument 627; Burke County, N. Dak., Assiniboia District, Sask.; the center of the horizontal letter "I" in the word "UNITED" cast on the south face of the monument shaft.....	1, 979. 6
International Boundary Monument 628; Burke County, N. Dak., Assiniboia District, Sask.; the center of the horizontal letter "I" in the word "UNITED" cast on the south face of the monument shaft.....	1, 973. 1
International Boundary Monument 629; Burke County, N. Dak., Assiniboia District, Sask.; the center of the horizontal letter "I" in the word "UNITED" cast on the south face of the monument shaft.....	1, 973. 0
International Boundary Monument 630; Portal, Burke County, N. Dak., North Portal, Assiniboia District, Sask.; in the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey B. M.".....	<sup>14</sup> 1, 953. 056

## THE NORTH DAKOTA-MANITOBA LINE

International Boundary Monument 693; Bottineau County, N. Dak., Souris District, Man.; Geodetic Survey of Canada first-order bench mark, a copper bolt marked "G. S. C. B. M. 39-C" set horizontally in the north face of the concrete base of the monument.....	1, 729. 807
International Boundary Monument 694; Bottineau County, N. Dak., Souris District, Man.; the southeast corner of the concrete base of the monument.....	1, 748. 3
International Boundary Monument 695; Bottineau County, N. Dak., Souris District, Man.; the northwest corner of the concrete base of the monument.....	1, 825. 8
International Boundary Monument 696; Bottineau County, N. Dak., Souris District, Man.; the northeast corner of the concrete base of the monument.....	2, 144. 2
International Boundary Monument 697, 7 feet northwest of; Bottineau County, N. Dak., Souris District, Man.; bronze disk marked "U. S. & C. B. Survey" set in a rock and marking triangulation station "Bottineau".....	2, 243. 3
International Boundary Monument 698; Bottineau County, N. Dak., Souris District, Man.; the northwest corner of the concrete base of the monument.....	2, 282. 3
International Boundary Monument 699; Bottineau County, N. Dak., Souris District, Man.; the west edge of the concrete base of the monument.....	2, 541. 0
International Boundary Monument 700; Bottineau County, N. Dak., Souris District, Man.; the southeast corner of the concrete base of the monument.....	2, 333. 2
International Boundary Monument 701; Bottineau County, N. Dak., Souris District, Man.; the northwest corner of the concrete base of the monument.....	2, 153. 2
International Boundary Monument 702; Bottineau County, N. Dak., Souris District, Man.; the southeast corner of the concrete base of the monument.....	2, 148. 5
International Boundary Monument 703; Bottineau County, N. Dak., Souris District, Man.; the southwest corner of the concrete base of the monument.....	2, 178. 6
International Boundary Monument 704; Bottineau County, N. Dak., Souris District, Man.; the northeast corner of the concrete base of the monument.....	2, 194. 3
International Boundary Monument 705; Bottineau County, N. Dak., Souris District, Man.; the northwest corner of the concrete base of the monument.....	2, 262. 2
International Boundary Monument 706; Bottineau County, N. Dak., Souris District, Man.; the southeast corner of the concrete base of the monument.....	2, 253. 2
International Boundary Monument 707; Bottineau County, N. Dak., Souris District, Man.; the southeast corner of the concrete base of the monument.....	2, 247. 9

<sup>14</sup> This is also a first-order bench mark of the Geodetic Survey of Canada and of the United States Coast and Geodetic Survey.

	Elevation (feet)
International Boundary Monument 708; Rolette County, N. Dak., Souris District, Man.; the ground at the northeast corner of the concrete base of the monument.....	2, 269. 1
International Boundary Monument 709; Rolette County, N. Dak., Souris District, Man.; the northeast corner of the concrete base of the monument.....	2, 228. 0
International Boundary Monument 710; Rolette County, N. Dak., Souris District, Man.; the ground at the northwest corner of the concrete base of the monument.....	2, 207. 8
International Boundary Monument 711; Rolette County, N. Dak., Souris District, Man.; the northeast corner of the concrete base of the monument.....	2, 293. 4
International Boundary Monument 712; Rolette County, N. Dak., Souris District, Man.; the ground at the northeast corner of the concrete base of the monument.....	2, 357. 0
International Boundary Monument 713; Rolette County, N. Dak., Souris District, Man.; the ground at the northeast corner of the concrete base of the monument.....	2, 271. 7
International Boundary Monument 714; Rolette County, N. Dak., Souris District, Man.; the ground at the northeast corner of the concrete base of the monument.....	2, 240. 9
International Boundary Monument 715; Rolette County, N. Dak., Souris District, Man.; the ground at the northeast corner of the concrete base of the monument.....	2, 182. 5
International Boundary Monument 716; Rolette County, N. Dak., Souris District, Man.; the ground at the northeast corner of the concrete base of the monument.....	2, 124. 2
International Boundary Monument 717; Rolette County, N. Dak., Souris District, Man.; the ground at the northeast corner of the concrete base of the monument.....	2, 120. 4
International Boundary Monument 718; Rolette County, N. Dak., Souris District, Man.; the ground at the northeast corner of the concrete base of the monument.....	2, 065. 4
International Boundary Monument 719; Rolette County, N. Dak., Souris District, Man.; the ground at the northeast corner of the concrete base of the monument.....	2, 061. 2
International Boundary Monument 720; Rolette County, N. Dak., Souris District, Man.; the ground at the northeast corner of the concrete base of the monument.....	1, 935. 4
International Boundary Monument 721; Rolette County, N. Dak., Souris District, Man.; in the east side of the top of the concrete base of the monument; Geodetic Survey of Canada first-order bench mark, a copper bolt marked "G. S. C., B. M. 360-C".....	1, 901. 466
International Boundary Monument 721, ½ mile east of; Souris District, Man.; 10 feet north of the International Boundary Line and 10 feet east of the west limit of the Great Northern Railway right-of-way; Geodetic Survey of Canada first-order bench mark, a copper bolt set in the top of a concrete bench-mark pier and marked "G. S. C., B. M. 359-C".....	1, 886. 084
International Boundary Monument 742, 0.4 mile west of; Lisgar District, Man.; 10 feet north of the International Boundary Line and on the east boundary of sec. 6, T. 1, R. 13 W.; Geodetic Survey of Canada first-order bench mark, a copper bolt set horizontally in the north face of a concrete bench-mark pier and marked "G. S. C., B. M. 18-C".....	1, 548. 581
International Boundary Monument 816, ¼ mile east of; Gretna, Lisgar District, Man.; 190 feet north of the International Boundary Line and 47 feet west of the Great Northern Railway's abandoned track to West Gretna station; Geodetic Survey of Canada first-order bench mark, a copper bolt set in the top of a concrete bench-mark pier and marked "G. S. C., B. M. 431-D".....	829. 570
Gretna, Lisgar District, Man.; in the north stone foundation wall of the public school, 6½ feet from the northwest corner and 5¼ feet below the brickwork; Geodetic Survey of Canada first-order bench mark, a copper bolt set horizontally and marked "G. S. C., B. M. 432-D".....	833. 186
Gretna, Lisgar District, Man., 1¼ miles north of; 2 miles north of the International Boundary Line, 100 feet south of the road allowance along the north boundary of sec. 7, T. 1, R. 1 W., and 3 feet east of the west limit of the abandoned right-of-way of the Great Northern Railway; Geodetic Survey of Canada first-order bench mark, a copper bolt set in the top of a concrete bench-mark pier and marked "G. S. C., B. M. 430-D".....	830. 095

## THE MINNESOTA-MANITOBA LINE

Emerson, Provencher District, Man.; in the east stone foundation wall of the post office, 3 feet from the southeast corner, and 2 feet below the brickwork; Geodetic Survey of Canada first-order bench mark, a copper bolt marked "G. S. C., B. M. 3-C" set horizontally in the wall.....	Elevation (feet) 786. 526
Emerson, Provencher District, Man.; in the south stone foundation wall of the post office, 1 foot from the southwest corner and 2 feet 4 inches below the brickwork; Public Works Department of Canada bench mark, a copper bolt marked "MCCCCLXXIV" set horizontally in the wall; it is also a first-order bench mark of the Geodetic Survey of Canada.....	786. 050
International Boundary Monument 833; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 785" ..	785. 5
International Boundary Monument 834; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 776" ..	776. 0
International Boundary Monument 835; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 793" ..	793. 6
International Boundary Monument 836; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 776" ..	776. 2
International Boundary Monument 837; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 794" ..	794. 3
International Boundary Monument 838; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 794" ..	794. 7
International Boundary Monument 839; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 794" ..	793. 7
International Boundary Monument 840; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 794" ..	793. 9
International Boundary Monument 841; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 795" ..	795. 1
International Boundary Monument 842; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 799" ..	798. 9
International Boundary Monument 843; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 813" ..	812. 8
International Boundary Monument 844; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 854" ..	854. 0
International Boundary Monument 845; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 871" ..	870. 7
International Boundary Monument 846; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 884" ..	883. 9
International Boundary Monument 847; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 899" ..	898. 4
International Boundary Monument 848; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 912" ..	911. 6
International Boundary Monument 849; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 916" ..	916. 4
International Boundary Monument 850; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 929" ..	928. 9



	Elevation (feet)
International Boundary Monument 851; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 952"----	952. 1
International Boundary Monument 852; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 963"--	962. 8
International Boundary Monument 853; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 971"----	971. 1
International Boundary Monument 854; Kittson County, Minn., Provencher District, Man.; the top of the concrete base of the monument-----	973. 9
International Boundary Monument 855; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 980"---	980. 4
International Boundary Monument 856; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 983"-----	982. 6
International Boundary Monument 857; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 986"----	986. 2
International Boundary Monument 858; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 992"-----	991. 8
International Boundary Monument 859; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 998"-----	997. 5
International Boundary Monument 860; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1001"----	1, 000. 9
International Boundary Monument 861; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1001"---	1, 000. 8
International Boundary Monument 862; Kittson County, Minn., Provencher District, Man.; the top of the concrete base of the monument-----	1, 007. 5
International Boundary Monument 863; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1004"---	1, 003. 2
International Boundary Monument 864; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1002"---	1, 002. 0
International Boundary Monument 865; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1003"---	1, 003. 1
International Boundary Monument 866; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1011"---	1, 010. 0
International Boundary Monument 867; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1021"----	1, 021. 0
International Boundary Monument 867, 2½ miles south and ¼ mile west of; Kittson County, Minn.; at the northeast corner of sec. 9, T. 163 N., R. 45 W.; 39 feet south and 29 feet west of the intersection of the center lines of a north-and-south road and a road running west; United States Geological Survey bronze disk marked "1929 H 16" set in the top of a concrete post-----	1, 014. 4
International Boundary Monument 868; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1029"----	1, 028. 8
International Boundary Monument 869; Kittson County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1034"--	1, 033. 9
International Boundary Monument 870; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1041"----	1, 040. 9

	Elevation (feet)
International Boundary Monument 870, 1½ miles south and ⅓ mile west of; Kittson and Roseau Counties, Minn.; near the northwest corner of sec. 6, T. 163 N., R. 44 W.; on the east end of the concrete pier of the bridge over Roseau River; United States Geological Survey bronze disk marked "1929 H 21" set in the top of the pier.....	1, 020. 1
International Boundary Monument 871; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1042"....	1, 041. 7
International Boundary Monument 872; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1037"....	1, 037. 2
International Boundary Monument 872, ¼ mile south of; Roseau County, Minn.; in the NW¼ sec. 33, T. 164 N., R. 44 W.; 80 feet southwest of Noracres post office; near the west end of the middle concrete step at the north entrance to the residence of the postmaster; United States Geological Survey bronze disk marked "1929 H" set in the concrete.....	1, 029. 3
International Boundary Monument 873; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1035"....	1, 032. 8
International Boundary Monument 873, 730 feet west and 40 feet north of; Provencher District, Man.; at the corner of sections 4 and 5; bronze disk set in concrete..... <sup>15</sup>	1, 032. 0
International Boundary Monument 874; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1032".....	1, 032. 0
International Boundary Monument 875; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1033"....	1, 033. 7
International Boundary Monument 876; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1032"....	1, 031. 1
International Boundary Monument 876, ½ mile south of; Roseau County, Minn.; at the corner of Ts. 163 and 164 N., Rs. 43 and 44 W., 2 feet south of mound and old corner stake; bronze cap on iron post marked "T. T. Sta. No. 11 L. 1929"..... <sup>15</sup>	1, 026. 3
International Boundary Monument 876, 2 miles north of; Provencher District, Man.; 25 feet west of the northeast corner of sec. 11, T. 1, R. 9 E.; standard rock post of the Topographical Survey of Canada set in the north end of an embedded boulder 3 feet by 6 feet by 1½ feet high..... <sup>16</sup>	1, 060. 1
International Boundary Monument 877; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1032"....	1, 031. 3
International Boundary Monument 878; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1031"....	1, 030. 3
International Boundary Monument 879; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1034"....	1, 033. 2
International Boundary Monument 880; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1035"....	1, 034. 0
International Boundary Monument 880, 1¼ miles north of; Provencher District, Man.; on the west boundary of sec. 10, T. 1, R. 10 E., 1,040 feet north of the ¼ sec. corner; a standard rock post of the Topographical Survey of Canada set in an embedded boulder 3 feet by 3 feet by 1¼ feet high... <sup>16</sup>	1, 052. 8
International Boundary Monument 881; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1037".....	1, 037. 4
International Boundary Monument 882; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1039"....	1, 039. 0

<sup>15</sup> Established by United States Geological Survey.<sup>16</sup> Established by the Topographical Survey of Canada, 1929.

	Elevation (feet)
International Boundary Monument 883; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1041"----	1, 040. 5
International Boundary Monument 884; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1042"-----	1, 042. 0
International Boundary Monument 885; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1044"-----	1, 043. 7
Duxby, Roseau County, Minn.; about 6 miles south of the International Boundary Line, in the SW¼ sec. 26, T. 163 N., R. 42 W.; on the southwest part of the acre lot of N. M. Cedarholm, about 300 feet south of Roseau River, 250 feet east of Duxby post office, in the south track of the traveled road; a triangulation station bronze disk marked "U. S. & C. B. Survey" set in a concrete block to mark triangulation station "Duxby"----- <sup>17</sup>	1, 030. 2
International Boundary Monument 886; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1046"----	1, 045. 4
International Boundary Monument 886, 2 miles north and ¼ mile east of; Provencher District, Man.; 1,060 feet east and 6 feet north of the northwest corner of sec. 10, T. 1, R. 11 E.; a standard rock post of the Topographical Survey of Canada set in the highest point of an embedded boulder 3½ feet by 3½ feet by 2 feet high----- <sup>16</sup>	1, 085. 9
International Boundary Monument 887; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1066"----	1, 065. 6
International Boundary Monument 888; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1074"----	1, 073. 5
International Boundary Monument 888, 1½ miles south of; Roseau County, Minn.; 93 feet east and 20 feet north of the approximate corner of Ts. 163 and 164 N. and Rs. 41 and 42 W.; 74 feet east and 1 foot south of a fence corner; a bronze disk marked "T. T. Sta. No. 3 L. 1929" set in a concrete post; established by the United States Geological Survey-----	1, 050. 9
International Boundary Monument 889; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1070"----	1, 069. 7
International Boundary Monument 889, 2 miles north of; Provencher District, Man.; near the northeast corner of sec. 12, T. 1, R. 11 E.; in the east concrete foundation wall of the public school building, 2 feet south of the northeast corner; a standard rock post of the Topographical Survey of Canada set in the concrete----- <sup>16</sup>	1, 065. 3
International Boundary Monument 890; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1068"----	1, 066. 7
International Boundary Monument 891; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1052"----	1, 050. 6
International Boundary Monument 892; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1055"----	1, 054. 0
International Boundary Monument 893; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1080"----	1, 079. 3
International Boundary Monument 894; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1087"----	1, 086. 0
International Boundary Monument 895; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1070"----	1, 069. 5
International Boundary Monument 896; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1078"----	1, 076. 8

<sup>16</sup> Established by the Topographical Survey of Canada, 1929.<sup>17</sup> Elevation by the United States Geological Survey.

	Elevation (feet)
International Boundary Monument 897; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1057"---	1,056.7
International Boundary Monument 897, 2½ miles south of; Roseau County, Minn.; about 1,000 feet east of the quarter corner between secs. 5 and 8, T. 163 N., R. 39 W.; 396 feet southwest of a bridge over Mud Creek and on the west side of Sprague road; 30 feet north of an old fence; in the top of a concrete post; United States Geological Survey bronze disk marked "T. T. Sta. No. 9 L. 1929"-----	1,044.3
International Boundary Monument 898; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1059"---	1,057.7
International Boundary Monument 898, ½ mile south of; Roseau County, Minn.; about 900 feet west of the northeast corner of sec. 34, T. 164 N., R. 39 W.; at a United States water gage, on the west bank of Mud Creek, on the south side of the road, at the bridge; bronze disk in the top of a concrete post; established by the United States Geological Survey-----	1,051.2
International Boundary Monument 899; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1057"---	1,055.9
International Boundary Monument 900; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1065"---	1,064.4
International Boundary Monument 901; Roseau County, Minn., Provencher District, Man.; the top of the concrete base of the monument-----	1,066.7
International Boundary Monument 902; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1075"---	1,073.9
International Boundary Monument 903; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1097"---	1,096.3
International Boundary Monument 904; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1079"---	1,077.7
International Boundary Monument 905; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1078"---	1,077.4
International Boundary Monument 906; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1078"---	1,076.9
Salol, Roseau County, Minn.; on the south side of the Great Northern Railway; 1,100 feet west of the railway station, 80 feet south of the railroad track, 13 feet south of a telephone line between the railway and the highway; 100 feet east of a north-and-south road; in line with a church steeple and the kitchen window of Gustafson's house, both of which are south of the station; a triangulation station bronze disk marked "U. S. & C. B. Survey" set in a concrete block to mark triangulation station "Salol"-----	<sup>17</sup> 1,074.7
International Boundary Monument 907; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1072"---	1,071.9
International Boundary Monument 908; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1075"---	1,074.6
International Boundary Monument 909; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1072"---	<sup>18</sup> 1,072
International Boundary Monument 910; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1067"---	1,066.9
International Boundary Monument 911; Roseau County, Minn., Provencher District, Man.; in the top of the concrete base of the monument; bronze disk marked "U. S. & C. B. Survey, 1060"---	1,059.8

<sup>17</sup> Elevation by the United States Geological Survey.

<sup>18</sup> This bench mark is known to have been disturbed, and the elevation is now only approximate.

	Elevation (feet)
Sprague, Provencher District, Man.; at the water tank near the Canadian National Railway station; in the north face of the northeast concrete footing, 7 inches below the top; Geodetic Survey of Canada first-order bench mark, a copper bolt marked "G. S. C. B. M. 9-E" set horizontally in the concrete.....	1, 070. 270
Middlebro, Provencher District, Man.; on the Canadian National Railway, 520 feet east of the section house and at mileage 48.4 from Rainy River; 177 feet east of Geodetic Survey of Canada precise traverse station "Middleboro", and 37 feet south of the railway track; Geodetic Survey of Canada first-order bench mark, a copper bolt marked "G. S. C. B. M. 11-E" set horizontally in the north face of a concrete pier.....	1, 090. 652
International Boundary Monument 924; Roseau County, Minn., Provencher District, Man.; on the north side of Harrison Creek and the old Dawson Road, about 600 meters southwest of Northwest Angle Inlet; International Joint Commission bench mark, bronze plug set in the concrete base of the monument.....	1, 065. 67
Warroad, Roseau County, Minn.; 12 meters southwest of the intersection of Lake and State Streets, on the public-school grounds, 50 meters east of the schoolhouse; iron post with bronze cap marked "U. S. Geological Survey B. M. 1069".....	<sup>19</sup> 1, 067. 26
Warroad, Roseau County, Minn.; on the public-school ground, near the fence, in front of and to the west of the new schoolhouse; International Joint Commission bench mark, copper plug in concrete block whose base extends 6 feet below the surface of the ground.....	<sup>19</sup> 1, 068. 19
Warroad, Roseau County, Minn.; 335 meters east of the Lake Street crossing of the Canadian National Railway, 44 meters east of Mr. Moody's house, 12 meters north of the edge of Warroad River, and 17 meters southeast of an outbuilding on Mr. Moody's grounds; U. S. Engineer Corps bench mark No. 303, top of cap on iron post.....	<sup>19</sup> 1, 065. 35
Warroad, Roseau County, Minn.; in the west foundation wall of the post office, a concrete-block building on the north side of Lake Street about 120 meters east of the Canadian National Railway, 1.9 meters from the southwest corner of the building and 0.12 meter below the concrete blocks; Geodetic Survey of Canada bench mark No. 12-E, copper bolt marked "G. S. C., B. M. 12-E".....	1, 069. 296

#### USEFUL ELEVATIONS

The following list of elevations of the ground at international boundary monuments along sections of the boundary where few or no permanent bench marks were established is given as information useful for reconnaissance purposes. These elevations were determined by level lines run along the boundary for vertical control of the topographic mapping only. The limits of error permitted in the work and the extreme length of the lines between control bench marks do not warrant an adjustment of these levels. The elevations are given to the nearest foot as originally determined. The precise elevation of the initial point and of the terminal point of each line are given to indicate the closure error.

#### THE MONTANA-ALBERTA LINE

	Elevation (feet)
International Boundary Monument 334, bench mark in base of.....	<sup>20</sup> 3, 466. 666
International Boundary Monument 339, ground at.....	3, 377
International Boundary Monument 341, ground at.....	3, 322
International Boundary Monument 343, ground at.....	3, 534

<sup>19</sup> Elevation determined by Geodetic Survey of Canada.

<sup>20</sup> See p. 226 for description of bench mark.

	Elevation (feet)
International Boundary Monument 345, ground at.....	3, 759
International Boundary Monument 347, ground at.....	4, 237
International Boundary Monument 348, ground at.....	4, 198
International Boundary Monument 351, ground at.....	3, 671
International Boundary Monument 354, ground at.....	3, 662
International Boundary Monument 356, ground at.....	3, 550
International Boundary Monument 358, ground at.....	3, 701
International Boundary Monument 360, ground at.....	3, 809
International Boundary Monument 362, ground at.....	3, 648
International Boundary Monument 364, ground at.....	3, 522
International Boundary Monument 366, ground at.....	3, 593
International Boundary Monument 368, ground at.....	3, 447
International Boundary Monument 370, ground at.....	3, 419
International Boundary Monument 372, ground at.....	3, 263
International Boundary Monument 374, ground at.....	3, 193
International Boundary Monument 383, ground at.....	2, 984
International Boundary Monument 385, ground at.....	2, 882
International Boundary Monument 387, ground at.....	2, 918
International Boundary Monument 389, ground at.....	2, 802
International Boundary Monument 391, ground at.....	2, 791
International Boundary Monument 393, ground at.....	2, 794

## THE MONTANA-SASKATCHEWAN LINE

International Boundary Monument 395, ground at.....	2, 806
International Boundary Monument 397, ground at.....	2, 807
International Boundary Monument 399, ground at.....	2, 829
International Boundary Monument 401, ground at.....	2, 816
International Boundary Monument 403, 6 feet north of; bench mark.....	<sup>21</sup> 2, 753. 0
Elevation of same point determined by levels from the south.....	2, 752. 8
International Boundary Monument 404, ground at.....	2, 779
International Boundary Monument 406, ground at.....	<sup>22</sup> 2, 811
International Boundary Monument 407, ground at.....	2, 814
International Boundary Monument 409, ground at.....	2, 877
International Boundary Monument 411, ground at.....	2, 883
International Boundary Monument 412, ground at.....	2, 860
International Boundary Monument 413, ground at.....	2, 755

<sup>21</sup> See p. 227 for description of bench mark.<sup>22</sup> See p. 227 for bench mark nearby.

	Elevation (feet)
International Boundary Monument 414, ground at.....	2, 833
International Boundary Monument 415, ground at.....	2, 882
International Boundary Monument 416, ground at.....	2, 898
International Boundary Monument 417, ground at.....	<sup>23</sup> 2, 893
International Boundary Monument 418, ground at.....	2, 909
International Boundary Monument 419, ground at.....	2, 818
International Boundary Monument 420, ground at.....	<sup>24</sup> 2, 860
International Boundary Monument 421, ground at.....	2, 851
International Boundary Monument 422, ground at.....	2, 828
International Boundary Monument 423, ground at.....	2, 796
International Boundary Monument 424, ground at.....	2, 817
International Boundary Monument 425, ground at.....	<sup>24</sup> 2, 884
International Boundary Monument 426, ground at.....	2, 920
International Boundary Monument 427, ground at.....	3, 047
International Boundary Monument 428, ground at.....	3, 364
International Boundary Monument 429, ground at.....	<sup>24</sup> 3, 378
International Boundary Monument 430, ground at.....	3, 328
International Boundary Monument 431, ground at.....	3, 236
International Boundary Monument 432, ground at.....	3, 193
International Boundary Monument 433, ground at.....	3, 055
International Boundary Monument 434, ground at.....	3, 180
International Boundary Monument 435, ground at.....	3, 163
International Boundary Monument 436, ground at.....	<sup>24</sup> 3, 007
International Boundary Monument 437, ground at.....	3, 062
International Boundary Monument 438, ground at.....	3, 107
International Boundary Monument 439, ground at.....	3, 134
International Boundary Monument 441, ground at.....	3, 034
International Boundary Monument 442, ground at.....	3, 041
International Boundary Monument 443, ground at.....	3, 032
International Boundary Monument 444, ground at.....	3, 021
International Boundary Monument 445, ground at.....	2, 996
International Boundary Monument 446, ground at.....	3, 009
International Boundary Monument 447, ground at.....	2, 973

<sup>23</sup> See p. 227 for bench mark nearby.

<sup>24</sup> See p. 228 for bench mark nearby.

	Elevation (feet)
International Boundary Monument 448, ground at.....	2, 938
International Boundary Monument 449, ground at.....	2, 959
International Boundary Monument 450, ground at.....	2, 941
International Boundary Monument 451, ground at.....	2, 903
International Boundary Monument 452, ground at.....	2, 900
International Boundary Monument 453, ground at.....	2, 883
International Boundary Monument 454, ground at.....	2, 848
International Boundary Monument 455, ground at.....	2, 801
International Boundary Monument 456, ground at.....	2, 739
International Boundary Monument 457, ground at.....	2, 708
International Boundary Monument 458, ground at.....	2, 692
International Boundary Monument 459, ground at.....	2, 615
International Boundary Monument 460, ground at.....	2, 669
International Boundary Monument 461, ground at.....	2, 699
International Boundary Monument 462, ground at.....	2, 648
International Boundary Monument 463, ground at.....	2, 801
International Boundary Monument 464, ground at.....	2, 879
International Boundary Monument 465, ground at.....	2, 884
International Boundary Monument 466, ground at.....	2, 865
International Boundary Monument 467, ground at.....	2, 774
International Boundary Monument 468, ground at.....	2, 730
International Boundary Monument 469, ground at.....	2, 646
International Boundary Monument 471, ground at.....	2, 598
International Boundary Monument 472, ground at.....	2, 688
International Boundary Monument 473, ground at.....	2, 767
International Boundary Monument 476, ground at.....	2, 654
International Boundary Monument 478, bench mark in base of.....	2, 716. 7
Elevation of same point by adjusted levels from the east.....	<sup>25</sup> 2, 717. 0

## THE NORTH DAKOTA-SASKATCHEWAN LINE

International Boundary Monument 630, bench mark in base of.....	<sup>26</sup> 1, 953. 056
International Boundary Monument 631, ground at.....	1, 947
International Boundary Monument 632, ground at.....	1, 933
International Boundary Monument 633, ground at.....	1, 940
International Boundary Monument 634, ground at.....	1, 914

<sup>25</sup> See p. 229 for description of bench mark.<sup>26</sup> See p. 237 for description of bench mark.



	Elevation (feet)
International Boundary Monument 635, ground at.....	1, 894
International Boundary Monument 636, ground at.....	1, 879
International Boundary Monument 637, ground at.....	1, 895
International Boundary Monument 638, ground at.....	1, 858
International Boundary Monument 639, ground at.....	1, 834
International Boundary Monument 640, ground at.....	1, 823
International Boundary Monument 641, ground at.....	1, 827
International Boundary Monument 642, ground at.....	1, 851
International Boundary Monument 643, ground at.....	1, 849
International Boundary Monument 644, ground at.....	1, 854
International Boundary Monument 645, ground at.....	1, 845
International Boundary Monument 646, ground at.....	1, 859
International Boundary Monument 647, ground at.....	1, 814
International Boundary Monument 648, ground at.....	1, 794
International Boundary Monument 650, ground at.....	1, 802
International Boundary Monument 651, ground at.....	1, 792
International Boundary Monument 652, ground at.....	1, 772
International Boundary Monument 653, ground at.....	1, 765
International Boundary Monument 654, ground at.....	1, 748
International Boundary Monument 655, ground at.....	1, 739
International Boundary Monument 656, ground at.....	1, 710
International Boundary Monument 657, ground at.....	1, 684
International Boundary Monument 658, ground at.....	1, 678
International Boundary Monument 659, ground at.....	1, 655
International Boundary Monument 660, ground at.....	1, 641
International Boundary Monument 661, ground at.....	1, 612
International Boundary Monument 662, ground at.....	1, 630
International Boundary Monument 663, ground at.....	1, 623
International Boundary Monument 664, ground at.....	1, 618
International Boundary Monument 665, ground at.....	1, 611
International Boundary Monument 666, ground at.....	1, 599
International Boundary Monument 667, ground at.....	1, 599
International Boundary Monument 668, ground at.....	1, 580
International Boundary Monument 669, ground at.....	1, 581
International Boundary Monument 670, ground at.....	1, 547

THE NORTH DAKOTA-MANITOBA LINE		Elevation (feet)
International Boundary Monument 671, ground at.....		1, 541
International Boundary Monument 672, ground at.....		1, 527
International Boundary Monument 673, ground at.....		1, 522
International Boundary Monument 674, ground at.....		1, 517
International Boundary Monument 675, ground at.....		1, 512
International Boundary Monument 676, ground at.....		1, 508
International Boundary Monument 677, ground at.....		1, 497
International Boundary Monument 678, ground at.....		1, 494
International Boundary Monument 679, ground at.....		1, 492
International Boundary Monument 680, ground at.....		1, 495
International Boundary Monument 681, ground at.....		1, 488
International Boundary Monument 682, ground at.....		1, 458
International Boundary Monument 683, ground at.....		1, 484
International Boundary Monument 684, ground at.....		1, 501
International Boundary Monument 685, ground at.....		1, 510
International Boundary Monument 686, ground at.....		1, 519
International Boundary Monument 687, ground at.....		1, 526
International Boundary Monument 688, ground at.....		1, 539
International Boundary Monument 689, ground at.....		1, 528
International Boundary Monument 690, ground at.....		1, 525
International Boundary Monument 691, ground at.....		1, 546
International Boundary Monument 692, ground at.....		1, 630
International Boundary Monument 693, ground at.....		1, 731
International Boundary Monument 693, bench mark in base of.....	<sup>27</sup>	1, 729. 807
International Boundary Monument 721, bench mark in base of.....	<sup>28</sup>	1, 901. 466
International Boundary Monument 722, ground at.....		1, 872
International Boundary Monument 723, ground at.....		1, 852
International Boundary Monument 724, ground at.....		1, 827
International Boundary Monument 725, ground at.....		1, 819
International Boundary Monument 726, ground at.....		1, 799
International Boundary Monument 727, ground at.....		1, 776
International Boundary Monument 728, ground at.....		1, 752
International Boundary Monument 729, ground at.....		1, 698

<sup>27</sup> See p. 237 for description of bench mark.<sup>28</sup> See p. 238 for description of bench mark.

	Elevation (feet)
International Boundary Monument 730, ground at.....	1, 653
International Boundary Monument 731, ground at.....	1, 628
International Boundary Monument 732, ground at.....	1, 589
International Boundary Monument 733, ground at.....	1, 555
International Boundary Monument 734, ground at.....	1, 539
International Boundary Monument 735, ground at.....	1, 536
International Boundary Monument 736, ground at.....	1, 543
International Boundary Monument 737, ground at.....	1, 530
International Boundary Monument 738, ground at.....	1, 538
International Boundary Monument 739, ground at.....	1, 533
International Boundary Monument 740, ground at.....	1, 539
International Boundary Monument 741, ground at.....	1, 554
International Boundary Monument 742, bench mark near; Geodetic Survey of Canada No. 18-C.	1, 549. 863
Elevation of No. 18-C by 1928 general adjustment.....	<sup>28</sup> 1, 548. 581
International Boundary Monument 742, ground at.....	1, 570
International Boundary Monument 743, ground at.....	1, 569
International Boundary Monument 744, ground at.....	1, 587
International Boundary Monument 745, ground at.....	1, 611
International Boundary Monument 746, ground at.....	1, 597
International Boundary Monument 747, ground at.....	1, 585
International Boundary Monument 748, ground at.....	1, 572
International Boundary Monument 749, ground at.....	1, 561
International Boundary Monument 750, ground at.....	1, 552
International Boundary Monument 751, ground at.....	1, 553
International Boundary Monument 752, ground at.....	1, 545
International Boundary Monument 753, ground at.....	1, 545
International Boundary Monument 754, ground at.....	1, 542
International Boundary Monument 755, ground at.....	1, 533
International Boundary Monument 756, ground at.....	1, 542
International Boundary Monument 757, ground at.....	1, 556
International Boundary Monument 758, ground at.....	1, 579
International Boundary Monument 759, ground at.....	1, 561
International Boundary Monument 760, ground at.....	1, 560
International Boundary Monument 761, ground at.....	1, 564

<sup>28</sup> See p. 238 for description of bench mark.

	Elevation (feet)
International Boundary Monument 762, ground at.....	1, 568
International Boundary Monument 763, ground at.....	1, 576
International Boundary Monument 764, ground at.....	1, 586
International Boundary Monument 765, ground at.....	1, 564
International Boundary Monument 766, ground at.....	1, 563
International Boundary Monument 767, ground at.....	1, 551
International Boundary Monument 768, ground at.....	1, 543
International Boundary Monument 769, ground at.....	1, 537
International Boundary Monument 770, ground at.....	1, 543
International Boundary Monument 771, ground at.....	1, 541
International Boundary Monument 772, ground at.....	1, 546
International Boundary Monument 773, ground at.....	1, 542
International Boundary Monument 774, ground at.....	1, 544
International Boundary Monument 775, ground at.....	1, 543
International Boundary Monument 776, ground at.....	1, 543
International Boundary Monument 777, ground at.....	1, 555
International Boundary Monument 778, ground at.....	1, 564
International Boundary Monument 779, ground at.....	1, 560
International Boundary Monument 780, ground at.....	1, 554
International Boundary Monument 781, ground at.....	1, 558
International Boundary Monument 782, ground at.....	1, 554
International Boundary Monument 783, ground at.....	1, 552
International Boundary Monument 784, ground at.....	1, 528
International Boundary Monument 796, ground at.....	1, 014
International Boundary Monument 797, ground at.....	979
International Boundary Monument 798, ground at.....	963
International Boundary Monument 799, ground at.....	948
International Boundary Monument 800, ground at.....	944
International Boundary Monument 801, ground at.....	938
International Boundary Monument 802, ground at.....	926
International Boundary Monument 803, ground at.....	912
International Boundary Monument 804, ground at.....	909
International Boundary Monument 805, ground at.....	900
International Boundary Monument 806, ground at.....	882

	Elevation (feet)
International Boundary Monument 807, ground at.....	881
International Boundary Monument 808, ground at.....	877
International Boundary Monument 809, ground at.....	874
International Boundary Monument 810, ground at.....	861
International Boundary Monument 811, ground at.....	850
International Boundary Monument 812, ground at.....	852
International Boundary Monument 813, ground at.....	844
International Boundary Monument 814, ground at.....	839
International Boundary Monument 815, ground at.....	836
International Boundary Monument 816, ground at.....	834
Geodetic Survey of Canada bench mark No. 4-C.....	832. 744
Geodetic Survey of Canada bench mark No. 4-C, on datum of 1928 adjustment.....	<sup>29</sup> 828. 810
International Boundary Monument 817, ground at.....	825
International Boundary Monument 818, ground at.....	822
International Boundary Monument 819, ground at.....	819
International Boundary Monument 820, ground at.....	813
International Boundary Monument 821, ground at.....	803
International Boundary Monument 822, ground at.....	798
International Boundary Monument 823, ground at.....	796
International Boundary Monument 824, ground at.....	799
International Boundary Monument 825, ground at.....	792
International Boundary Monument 826, ground at.....	792
International Boundary Monument 827, ground at.....	789
International Boundary Monument 828, ground at.....	790
International Boundary Monument 829, ground at.....	791
International Boundary Monument 830, ground at.....	792
International Boundary Monument 831, ground at.....	789
International Boundary Monument 832, ground at.....	790
Geodetic Survey of Canada bench mark No. 3-C.....	786. 169
Geodetic Survey of Canada bench mark No. 3-C, correct elevation.....	<sup>30</sup> 786. 526

<sup>29</sup> This bench mark was reported lost in 1925.

<sup>30</sup> See p. 239 for description of bench mark.

## APPENDIX V

### GEOGRAPHIC POSITIONS AND DESCRIPTIONS OF TRIANGULATION AND TRAVERSE STATIONS

This appendix contains: The tables of geographic positions of the triangulation and traverse stations used in determining the latitudes and longitudes of the boundary monuments and marks and in controlling the topographic surveys; the descriptions of all the marked triangulation and traverse stations other than boundary monuments; sketches of the triangulation and traverse schemes; and a station index to the tables, descriptions, and sketches.

#### EXPLANATION OF TABLES

All latitudes and longitudes are given in terms of the North American geodetic datum of 1927.<sup>1</sup> All azimuths are reckoned clockwise from the south. All distances are given in meters and are reduced to their mean-sea-level values.<sup>2</sup> Note should be made of the fact that the logarithms of distances have been derived from the computations and the distances have been derived from their corresponding logarithms. The azimuth and length of any line will be found opposite the second of the two stations of that line in the order in which they are listed. The following abbreviations have been used: "Mon." for Monument, "Ref." for Reference, and "ecc." for eccentric station.

In the tables of first-order triangulation stations the latitudes and longitudes are given to thousandths of seconds, the azimuths to hundredths of seconds, and the logarithms of distances to seven decimal places. The same is true for first-order traverse stations except that the azimuths are given to tenths of seconds only. In the tables of major triangulation stations the latitudes and longitudes are given to thousandths of seconds, the azimuths to tenths of seconds, and the logarithms of distances to six decimal places. In the tables of minor triangulation stations the latitudes and longitudes are given to hundredths of seconds, the azimuths to even seconds, and the logarithms of distances to six decimal places.

In selecting stations upon which new triangulation is to be based, points of the first-order or of the major schemes of triangulation should be chosen in preference to those of a lower order. In searching for a particular triangulation station on the ground, reference should be made to the boundary maps and triangulation sketches as well as to the printed description of the station.

The use of the station index and the triangulation sketches will materially facilitate obtaining any specific geodetic data desired.

<sup>1</sup> See p. 144.

<sup>2</sup> Formula for reduction, p. 143.

**GEOGRAPHIC POSITIONS OF TRIANGULATION AND TRAVERSE STATIONS, FROM GEORGIA STRAIT TO LAKE OF THE WOODS, FIRST-ORDER SCHEME**

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Benson (Geodetic Survey of Canada).....	49 08 59.357 124 02 56.629					
Gardner (Geodetic Survey of Canada)...	49 22 36.960 123 23 20.549	62 31 00.26	342 00 59.86	Benson.....	54, 276.36	4.7346107
Little Mountain (Geodetic Survey of Canada).....	49 14 33.062 123 06 44.216	81 46 07.65 126 42 34.04	261 03 34.88 306 29 58.57	Benson..... Gardner.....	69, 051.94 25, 070.36	4.8391759 4.3991606
Delta west base (Geodetic Survey of Canada).....	49 02 48.396 123 04 25.557	90 30 30.66 148 05 15.95 172 39 31.19	278 46 16.86 327 50 56.61 352 37 46.32	Benson..... Gardner..... Little Mountain.....	72, 141.48 43, 311.85 21, 949.44	4.8581851 4.6366067 4.3414234
Delta east base (Geodetic Survey of Canada).....	49 05 39.212 122 55 20.430	64 33 37.60 94 43 30.20 132 56 47.76 140 02 40.11	244 26 45.75 273 52 23.26 312 35 35.23 319 54 02.74	Delta west base..... Benson..... Gardner..... Little Mountain.....	12, 258.55 82, 476.60 46, 301.01 21, 537.36	4.0884391 4.9163308 4.6655905 4.3331924
Bruce (Geodetic Survey of Canada).....	48 46 01.706 123 30 22.022	137 08 56.54 187 08 43.33 208 26 41.37 225 22 58.53 229 24 15.76	316 44 22.31 7 14 01.77 28 44 31.49 45 42 31.55 49 50 40.19	Benson..... Gardner..... Little Mountain..... Delta west base..... Delta east base.....	58, 242.36 92, 778.98 60, 209.60 44, 403.66 56, 150.77	4.7652390 4.9674596 4.7796657 4.6474188 4.7493557
Birch Point (Geodetic Survey of Canada).....	48 56 30.854 122 49 12.021	69 09 10.27 104 53 41.78 122 13 31.84 139 35 19.94 147 33 01.34 156 11 52.93	248 38 10.25 283 58 00.12 302 02 02.44 319 09 30.15 327 19 46.13 336 07 14.81	Bruce..... Benson..... Delta west base..... Gardner..... Little Mountain..... Delta east base.....	53, 972.02 92, 778.98 21, 929.36 63, 744.66 39, 666.00 18, 519.96	4.7321687 4.9674596 4.3410259 4.8044438 4.5984184 4.2676400
Douglas (Geodetic Survey of Canada).....	48 29 35.705 123 20 43.598	158 48 38.11 217 34 40.21	338 41 24.03 37 58 21.68	Bruce..... Birch Point.....	32, 679.00 63, 120.39	4.5142688 4.8001697
Constitution (Geodetic Survey of Canada).....	48 40 39.873 122 49 47.541	61 51 13.45 101 33 09.65 181 24 34.20	241 28 01.51 281 02 40.08 1 25 00.93	Douglas..... Bruce..... Birch Point.....	43, 218.21 50, 741.26 29, 385.27	4.6356668 4.7053612 4.4681297
Discovery (U. S. C. & G. S.).....	48 25 32.291 123 13 32.133	130 20 55.77 226 02 01.06	310 15 32.83 46 19 48.87	Douglas..... Constitution.....	11, 623.73 40, 490.29	4.0653454 4.8073509
Iceberg (U. S. C. & G. S.).....	48 25 12.161 122 53 00.408	91 32 03.93 103 34 19.14 187 50 20.57	271 16 42.52 283 13 34.32 7 52 45.13	Discovery..... Douglas..... Constitution.....	25, 331.81 35, 128.59 28, 927.91	4.4026663 4.5456607 4.4613171
Parke (Geodetic Survey of Canada).....	48 50 23.745 123 17 41.386	5 32 34.33 62 32 14.38 297 38 23.69	185 30 17.51 242 22 42.03 117 59 22.32	Douglas..... Bruce..... Constitution.....	38, 731.57 17, 505.40 38, 652.64	4.5880651 4.2431719 4.5871792
Avenue (Geodetic Survey of Canada).....	49 00 08.939 123 05 18.291	40 00 08.23 49 39 01.08 103 30 11.88	219 50 48.08 229 20 08.18 282 46 38.80	Parke..... Bruce..... Benson.....	23, 572.21 40, 292.59 72, 074.21	4.3724003 4.6052252 4.8577799
Whitcomb (U. S. C. & G. S.).....	48 41 19.667 122 21 34.705	88 08 36.37 129 56 59.00	267 47 24.92 309 36 11.71	Constitution..... Birch Point.....	34, 648.20 43, 993.65	4.5396807 4.6433900
Sumas (U. S. C. & G. S.).....	48 54 55.332 122 13 14.783	22 05 41.04 59 40 03.99 94 04 13.14	201 59 24.88 239 12 34.20 273 37 06.81	Whitcomb..... Constitution..... Birch Point.....	27, 183.21 51, 971.00 44, 009.85	4.4343007 4.7157611 4.6435499
Sisters (U. S. C. & G. S.).....	48 42 18.150 121 59 09.951	86 22 54.18 143 41 58.11	266 06 03.97 323 31 22.35	Whitcomb..... Sumas.....	27, 558.39 29, 055.20	4.4402538 4.4632239
Church (U. S. C. & G. S.).....	48 55 42.410 121 52 53.686	17 12 31.91 52 59 01.37 86 46 46.97	197 07 48.73 232 37 26.28 266 31 26.49	Sisters..... Whitcomb..... Sumas.....	26, 002.87 44, 083.35 24, 901.48	4.4150214 4.6442746 4.3962252
Bacon (U. S. C. & G. S.).....	48 39 46.324 121 31 09.316	97 56 38.44 138 06 19.94	277 35 36.14 317 49 58.57	Sisters..... Church.....	34, 664.83 39, 760.92	4.5402648 4.5994564
Glacier (U. S. C. & G. S.).....	48 58 11.358 121 14 21.363	31 10 12.72 84 39 23.89	210 57 34.13 264 10 20.10	Bacon..... Church.....	39, 850.25 47, 272.78	4.6004310 4.6746112
Davis.....	48 43 46.558 121 12 05.662	72 30 53.81 87 35 11.85 174 06 05.92	252 16 34.68 266 59 48.99 354 04 23.74	Bacon..... Sisters..... Glacier.....	24, 536.19 57, 795.39 26, 857.22	4.3898072 4.7618932 4.4290611
Jackita (U. S. C. & G. S.).....	48 46 24.892 120 51 01.998	79 24 10.26 127 34 21.09	259 08 20.16 307 16 47.03	Davis..... Glacier.....	26, 272.16 35, 908.97	4.4194957 4.5552029
Frosty.....	49 00 38.987 120 50 10.946	2 15 45.04 40 43 24.94 81 21 37.09	182 15 06.57 220 26 54.66 261 03 22.60	Jackita..... Davis..... Glacier.....	26, 404.33 41, 181.84 29, 837.64	4.4216752 4.6147057 4.4747645
Robinson.....	48 43 36.080 120 34 25.544	104 25 27.18 148 42 41.93	284 12 58.00 328 30 49.85	Jackita..... Frosty.....	21, 007.89 56, 993.21	4.3223824 4.5681221
Sheep (U. S. C. & G. S.).....	48 58 36.203 120 23 14.331	26 17 16.94 56 33 32.51 96 45 11.28	206 08 51.51 236 12 36.29 276 24 51.32	Robinson..... Jackita..... Frosty.....	30, 973.44 40, 805.71 33, 081.70	4.4906895 4.6107209 4.5195886
Rommel (U. S. C. & G. S.).....	48 55 24.719 120 11 44.290	51 54 50.55 112 55 07.08	231 37 45.92 292 46 26.09	Robinson..... Sheep.....	35, 345.50 15, 235.07	4.5483342 4.1828445

## GEORGIA STRAIT TO LAKE OF THE WOODS, FIRST-ORDER SCHEME—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Tiffany (U. S. C. & G. S.)	48 40 10.927 119 55 52.734	97 53 42.83 135 43 42.12 145 34 19.04	277 24 45.33 315 23 06.51 325 22 23.11	Robinson Sheep Rommel	47,718.80 47,822.25 34,262.61	4.6786895 4.6796300 4.5348204
Chopaka (U. S. C. & G. S.)	48 57 27.132 119 47 01.016	18 46 38.90 83 00 53.05	198 39 58.75 262 42 14.63	Tiffany Rommel	33,797.23 30,421.03	4.5288811 4.4831739
Lemanasky (U. S. C. & G. S.)	48 44 35.544 119 37 16.176	70 24 57.59 115 38 43.19 153 29 06.97	250 10 58.67 295 12 46.31 333 21 46.58	Tiffany Rommel Chopaka	24,247.66 46,701.30 28,650.80	4.3846668 4.6963290 4.4257102
Oroville (U. S. C. & G. S.)	48 53 44.203 119 20 12.879	51 02 01.04 102 02 54.51	230 49 10.87 281 42 42.18	Lemanasky Chopaka	26,888.72 33,451.73	4.4295702 4.5241186
Anarchist (U. S. C. & G. S.)	49 03 40.449 110 23 41.405	25 13 12.93 68 04 36.18 347 00 48.72	205 02 58.93 247 46 59.73 167 03 26.05	Lemanasky Chopaka Oroville	39,060.48 30,092.30 18,900.72	4.5018043 4.4870294 4.2764783
Osoyoos south base (U. S. C. & G. S.)	48 57 02.889 119 26 26.415	195 15 21.42 308 52 08.98	15 17 25.96 128 56 50.56	Anarchist Oroville	12,730.93 9,772.14	4.1048600 3.9898906
Osoyoos north base (U. S. C. & G. S.)	49 01 41.278 119 28 10.697	236 01 28.52 326 32 40.03 346 08 24.80	56 04 51.90 146 38 40.44 166 09 43.50	Anarchist Oroville Osoyoos south base	6,592.44 17,654.04 8,857.349	3.8190463 4.2468440 3.9473038
Gillespie	49 01 56.798 119 11 54.038	33 44 52.80 102 38 25.35	213 38 36.52 282 29 31.10	Oroville Anarchist	18,289.70 14,717.09	4.2622067 4.1678220
Spur (U. S. C. & G. S.)	48 49 39.908 119 04 43.569	111 49 07.21 158 59 23.54	291 37 27.28 338 53 58.97	Oroville Gillespie	20,390.60 24,391.96	4.3094299 4.3872466
Bodie (U. S. C. & G. S.)	48 49 39.128 118 49 53.942	90 10 08.81 130 26 17.56	269 58 59.20 310 09 42.33	Spur Gillespie	18,143.79 35,231.60	4.2587278 4.5466324
Greenwood (U. S. C. & G. S.)	49 04 22.324 118 43 46.027	15 21 27.02 43 18 14.06 82 42 07.12	195 16 50.01 223 02 26.19 262 20 52.60	Bodie Spur Gillespie	28,288.18 37,376.78 34,556.01	4.4516050 4.5726019 4.5385236
Leona (U. S. C. & G. S.)	48 46 05.664 118 28 21.491	104 10 15.12 151 01 27.96	283 54 02.69 330 49 50.59	Bodie Greenwood	27,188.38 38,760.60	4.4343834 4.5883905
Christina (U. S. C. & G. S.)	49 03 56.271 118 19 51.006	17 29 58.35 54 22 08.10 91 43 57.51	197 23 33.57 233 59 28.51 271 25 52.93	Leona Bodie Greenwood	34,666.94 45,243.15 29,151.24	4.5399156 4.6555528 4.4646571
O'Toole (U. S. C. & G. S.)	48 48 32.364 117 52 58.201	84 15 10.29 131 10 35.58	263 48 32.97 310 50 19.63	Leona Christina	43,578.78 43,496.22	4.6392551 4.6384515
Glory (U. S. C. & G. S.)	49 08 59.843 117 54 39.687	44 18 23.26 73 08 51.73 356 52 27.12	223 52 58.32 252 49 49.26 176 53 43.69	Leona Christina O'Toole	59,106.62 32,055.37 37,974.78	4.7716361 4.5059008 4.5794953
Kelly (U. S. C. & G. S.)	49 08 22.007 117 25 32.296	42 30 01.00 92 04 26.03	222 09 19.30 271 42 24.36	O'Toole Glory	49,708.31 35,433.94	4.6964290 4.5494195
Hall (U. S. C. & G. S.)	48 48 23.942 117 15 21.293	90 33 34.46 128 46 11.16 161 30 16.58	270 05 16.12 306 16 31.83 341 22 35.64	O'Toole Glory Kelly	46,051.06 61,298.70 39,040.27	4.6632397 4.7874513 4.5915128
Snowy (U. S. C. & G. S.)	48 59 31.022 116 59 08.557	43 58 30.26 117 11 52.33	223 46 17.24 296 51 55.87	Hall Kelly	28,585.74 30,091.73	4.4561495 4.5571077
Summit (U. S. C. & G. S.)	49 10 39.412 116 49 45.647	29 00 37.01 37 16 37.14 84 39 05.61	208 53 31.63 216 57 18.30 264 12 01.62	Snowy Hall Kelly	23,596.79 51,735.29 43,700.97	4.3728529 4.7137869 4.6404911
Parker (U. S. C. & G. S.)	48 52 26.064 116 35 12.224	81 35 41.57 114 19 56.79 152 22 33.64	261 05 27.82 294 01 53.88 332 11 34.20	Hall Snowy Summit	49,689.41 32,046.38 38,152.72	4.6962639 4.5057790 4.5815255
Kid (U. S. C. & G. S.)	49 15 04.894 116 11 43.573	34 24 44.55 80 10 14.93	214 07 00.41 259 41 27.03	Parker Summit	50,791.78 46,908.65	4.7057934 4.6712529
Ewing (U. S. C. & G. S.)	48 55 45.647 115 58 49.225	82 20 00.47 114 18 16.64 156 23 36.60	261 52 35.40 293 39 48.04 336 13 51.39	Parker Summit Kid	44,884.59 67,922.97 39,106.26	4.6520073 4.8320167 4.5922463
Moyie (U. S. C. & G. S.)	49 15 14.054 115 45 51.347	23 41 56.15 89 38 48.63	203 32 08.26 269 19 12.67	Ewing Kid	39,394.04 31,392.12	4.5954305 4.4968207
Yaak (U. S. C. & G. S.)	48 58 01.443 115 24 39.810	84 28 12.76 119 11 50.13 141 10 50.35	264 02 27.26 298 36 15.46 320 54 49.10	Ewing Kid Moyie	41,910.26 65,417.70 41,019.64	4.6223204 4.8156953 4.6129919
Broadwood (U. S. C. & G. S.)	49 17 47.384 114 59 22.375	40 10 42.10 85 29 26.91	219 51 34.58 264 54 13.27	Yaak Moyie	47,838.53 56,574.48	4.6797778 4.7526206
Green	48 57 40.241 114 55 59.047	91 15 08.04 118 31 22.07 173 42 48.42	270 53 30.07 297 53 40.05 353 40 14.67	Yaak Moyie Broadwood	35,007.66 68,870.22 37,518.53	4.5441631 4.8380315 4.5742458
Frost	49 04 19.036 115 11 07.117	54 50 51.45 303 38 04.36	234 40 37.92 123 49 29.86	Yaak Green	20,216.87 22,186.11	4.3057140 4.3460811

122824°—37—18



## GEORGIA STRAIT TO LAKE OF THE WOODS, FIRST-ORDER SCHEME—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	"	°	'	"	°	'	"			
Campbell.....	48	57	40.017	92	06	07.57	271	54	26.37	Yaak.....	18,920.39	4.2769300
	115	09	10.208	169	06	14.44	349	04	46.18	Frost.....	12,553.20	4.0987545
				269	53	32.74	90	03	29.48	Green.....	16,093.74	4.2066571
Tuchuck.....	48	58	34.783	85	01	28.44	264	49	44.53	Green.....	19,053.39	4.2796724
	114	40	25.919	147	13	02.28	326	58	42.81	Broadwood.....	42,408.76	4.6274556
Scarpe (U. S. C. & G. S.).....	49	12	47.833	37	10	46.99	216	58	25.13	Tuchuck.....	23,030.19	4.5189111
	114	24	04.363	54	23	02.17	233	58	55.21	Green.....	47,910.43	4.6804301
				102	24	52.67	281	58	08.01	Broadwood.....	43,819.09	4.6416634
Sunkist (U. S. C. & G. S.).....	49	09	28.968	50	05	24.09	229	50	28.80	Tuchuck.....	31,417.19	4.4971673
	114	20	40.879	146	10	12.58	326	07	38.57	Scarpe.....	7,397.42	3.8690800
Carter (U. S. C. & G. S.).....	48	53	31.437	102	18	53.73	281	51	53.11	Tuchuck.....	44,740.24	4.6506983
	114	04	36.446	146	32	41.91	326	17	59.76	Scarpe.....	42,877.81	4.6322326
				146	34	51.29	326	22	43.25	Sunkist.....	35,480.44	4.5499890
Dungarvan (U. S. C. & G. S.).....	49	09	18.219	14	54	28.43	194	49	39.89	Carter.....	30,260.84	4.4808810
	113	58	14.264	90	50	19.54	270	33	20.83	Sunkist.....	27,287.62	4.4359656
				101	49	07.09	281	29	33.95	Scarpe.....	32,052.11	4.5058566
Crossley (U. S. C. & G. S.).....	48	53	06.740	92	04	48.09	271	51	06.04	Carter.....	22,239.68	4.3471286
	113	46	25.378	154	26	10.95	334	17	15.78	Dungarvan.....	33,287.92	4.5222867
Beazer (U. S. C. & G. S.).....	49	05	40.363	44	22	58.71	224	08	56.47	Crossley.....	32,509.78	4.5120140
	113	27	49.234	100	29	59.35	280	06	59.37	Dungarvan.....	37,610.04	4.5753038
Cracker (U. S. C. & G. S.).....	48	43	55.476	119	01	10.36	298	41	19.31	Carter.....	36,867.65	4.5666455
	113	38	13.768	149	33	04.77	329	26	54.83	Crossley.....	19,763.53	4.2958645
Divide (U. S. C. & G. S.).....	48	47	56.574	70	03	01.64	249	50	30.32	Cracker.....	21,719.08	4.3368415
	113	21	34.703	107	39	06.38	287	20	24.05	Crossley.....	31,869.63	4.5033770
				166	58	57.88	346	54	15.45	Beazer.....	33,733.90	4.5280665
Mussetter (U. S. C. & G. S.).....	48	54	57.859	61	21	25.25	241	06	49.42	Divide.....	27,043.77	4.4320672
	113	02	11.701	122	34	50.18	302	15	38.70	Beazer.....	37,019.21	4.5684272
Ross (U. S. C. & G. S.).....	49	10	17.238	17	31	09.77	197	25	37.30	Mussetter.....	29,775.18	4.4738544
	112	54	51.474	38	22	25.84	218	02	16.12	Divide.....	52,704.49	4.7218476
				78	09	54.26	257	44	58.61	Beazer.....	40,995.21	4.6127331
Landslide (U. S. C. & G. S.).....	48	54	38.285	91	20	43.24	271	02	51.57	Mussetter.....	28,957.02	4.4617539
	112	38	29.856	145	36	06.14	325	23	44.84	Ross.....	35,196.46	4.5464989
Ridge (U. S. C. & G. S.).....	48	58	49.361	58	17	02.73	238	09	54.84	Mussetter.....	13,580.56	4.1329178
	112	52	44.297	173	05	16.38	353	03	40.29	Ross.....	21,406.08	4.3305371
				293	57	07.40	114	07	51.73	Landslide.....	19,037.96	4.2796204
Boundary west base (U. S. C. & G. S.).....	48	59	54.554	36	52	41.09	216	48	26.50	Mussetter.....	11,452.54	4.0589020
	112	56	34.141	186	10	12.95	6	11	30.54	Ross.....	19,348.47	4.2866466
				293	17	27.69	113	20	21.13	Ridge.....	5,088.34	3.7065757
				293	46	28.68	114	00	06.44	Landslide.....	24,126.06	4.3824864
Boundary east base (U. S. C. & G. S.).....	48	59	55.018	90	00	40.73	269	52	09.56	Boundary west base.....	13,767.665	4.1388603
	112	45	16.823	148	49	03.91	328	41	49.66	Ross.....	22,481.99	4.3518347
				319	43	08.85	139	48	15.78	Landslide.....	12,817.33	4.1077975
Meeks (U. S. C. & G. S.).....	49	12	21.465	31	51	06.12	211	38	30.03	Landslide.....	38,022.12	4.5868361
	112	21	48.912	51	13	45.44	230	56	01.23	Boundary east base.....	36,706.00	4.5647371
				56	30	45.49	236	07	23.23	Ridge.....	45,236.33	4.6554874
				61	36	23.18	241	10	06.99	Boundary west base.....	48,181.81	4.6828831
				84	44	52.22	264	19	51.69	Ross.....	40,328.32	4.6056102
Senior (U. S. C. & G. S.).....	49	04	24.367	58	29	27.73	238	11	17.91	Landslide.....	34,493.23	4.5377339
	112	14	25.652	148	40	49.79	328	35	14.55	Meeks.....	17,261.24	4.2370720
McCormick (U. S. C. & G. S.).....	48	51	24.868	99	15	15.51	278	52	10.25	Landslide.....	37,934.66	4.5790362
	112	07	51.123	161	36	36.41	341	31	38.81	Senior.....	25,381.78	4.4045221
Verdigris (U. S. C. & G. S.).....	49	09	31.729	13	02	57.52	192	58	09.42	McCormick.....	34,459.34	4.5373070
	112	01	29.431	58	58	57.41	238	49	10.56	Senior.....	18,382.92	4.2644146
				102	06	54.36	281	51	31.46	Meeks.....	25,247.22	4.4022136
West Butte (U. S. C. & G. S.).....	48	55	53.610	79	31	47.16	259	04	41.29	McCormick.....	44,728.76	4.6505869
	111	31	53.363	125	12	19.62	304	49	58.28	Verdigris.....	44,041.10	4.6438582
Kippen (U. S. C. & G. S.).....	49	12	00.457	7	36	40.04	187	34	11.91	West Butte.....	30,131.80	4.4790251
	111	28	37.288	51	38	56.18	231	09	18.93	McCormick.....	61,182.79	4.7866293
				83	38	43.29	263	13	50.84	Verdigris.....	40,205.16	4.6042818
Hill (U. S. C. & G. S.).....	48	51	16.975	106	44	14.54	286	26	33.52	West Butte.....	29,929.46	4.4760989
	111	08	25.205	147	27	59.69	327	12	44.54	Kippen.....	45,627.09	4.6592285
Antelope (U. S. C. & G. S.).....	49	05	19.982	28	53	33.66	208	44	42.21	Hill.....	29,722.90	4.4730912
	110	56	40.713	68	02	59.23	247	36	24.56	West Butte.....	46,361.22	4.6661549
				107	52	03.84	287	27	54.22	Kippen.....	40,766.23	4.6103006
Pinhorn (U. S. C. & G. S.).....	49	00	24.788	42	40	18.73	222	30	42.52	Hill.....	22,986.59	4.3614745
	110	55	40.911	172	25	15.12	352	24	29.95	Antelope.....	9,199.59	3.9637684
Milk (U. S. C. & G. S.).....	49	03	38.760	51	23	08.21	231	05	30.12	Hill.....	36,600.28	4.5634844
	110	45	02.315	65	16	20.81	245	08	18.61	Pinhorn.....	14,288.56	4.1549884
				102	30	49.44	282	22	01.75	Antelope.....	14,515.28	4.1618253

## GEORGIA STRAIT TO LAKE OF THE WOODS, FIRST-ORDER SCHEME—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	''	°	'	''	°	'	''			
New (U. S. C. & G. S.).....	48	57	26.773	66	45	46.81	246	29	28.62	Hill.....	28,795.13	4.4593190
	110	46	47.235	116	55	49.04	296	49	06.38	Pinhorn.....	12,165.30	4.0851227
				190	30	03.03	10	31	22.22	Milk.....	11,687.43	4.0677191
Joplin (U. S. C. & G. S.).....	48	35	15.942	135	10	18.94	314	52	08.22	Hill.....	41,967.70	4.6229152
	110	44	13.833	175	39	32.26	355	37	36.89	New.....	41,228.99	4.6152027
Goldstone (U. S. C. & G. S.).....	48	52	55.681	29	17	17.59	209	06	04.73	Joplin.....	37,499.07	4.5740205
	110	29	18.684	86	35	50.06	266	06	22.65	Hill.....	47,918.19	4.6805004
				111	31	45.93	291	18	35.54	New.....	22,931.02	4.3604234
				136	05	16.40	315	53	24.53	Milk.....	27,621.52	4.4412476
Sage (U. S. C. & G. S.).....	49	09	18.394	11	56	06.46	191	52	08.73	Goldstone.....	31,024.64	4.4917068
	110	24	03.774	51	41	21.91	231	24	12.01	New.....	35,349.57	4.5453841
				67	47	16.34	247	31	24.94	Milk.....	27,598.11	4.4408794
Govanlock (U. S. C. & G. S.).....	49	07	44.592	53	20	28.11	232	57	47.31	Goldstone.....	45,789.67	4.6607675
	109	59	15.763	95	38	40.00	275	19	54.57	Sage.....	30,298.26	4.4814177
Simpson (U. S. C. & G. S.).....	48	52	51.112	90	24	27.08	269	59	48.93	Goldstone.....	39,976.67	4.6018066
	109	56	36.582	132	30	50.37	312	10	06.88	Sage.....	45,280.62	4.6559124
				173	19	52.83	353	17	52.69	Govanlock.....	27,789.99	4.4438884
Signal (U. S. C. & G. S.).....	48	56	42.096	56	00	19.30	235	53	48.44	Simpson.....	12,743.95	4.1053041
	109	47	58.000	146	08	40.48	326	00	08.68	Govanlock.....	24,664.72	4.3920762
Nashlinn (U. S. C. & G. S.).....	49	06	04.750	47	06	45.95	226	55	12.91	Signal.....	25,493.78	4.4064343
	109	32	40.038	50	08	16.28	229	50	12.25	Simpson.....	38,130.99	4.5812781
				95	36	43.33	275	16	36.92	Govanlock.....	32,606.70	4.5119729
Havre north base (U. S. C. & G. S.).....	48	56	49.885	73	59	11.59	253	43	28.36	Simpson.....	28,526.44	4.4235789
	109	35	45.160	89	09	08.34	268	59	55.71	Signal.....	14,913.83	4.1735892
				192	21	22.23	12	23	42.00	Nashlinn.....	17,548.53	4.2442407
Havre south base (U. S. C. & G. S.).....	48	46	24.197	114	46	27.49	294	30	25.88	Simpson.....	28,666.80	4.4573792
	109	35	19.083	141	03	22.90	320	53	51.36	Signal.....	24,568.82	4.3903843
				178	25	38.67	358	25	19.03	Havre north base.....	19,335.30	4.2863509
				185	03	19.32	5	05	19.24	Nashlinn.....	36,612.11	4.5636248
Old Man (U. S. C. & G. S.).....	49	10	00.962	31	50	59.82	211	34	16.81	Havre south base.....	51,445.87	4.7113505
	109	13	09.500	73	01	44.51	252	46	59.29	Nashlinn.....	24,825.27	4.3948940
Cherry (Geodetic Survey of Canada).....	48	52	29.682	76	36	11.07	256	07	33.65	Havre south base.....	47,890.68	4.6802510
	108	57	17.393	120	28	59.75	300	02	18.05	Nashlinn.....	49,963.40	4.6986520
				149	19	09.06	329	07	10.27	Old Man.....	37,800.62	4.5774969
Lucky (Geodetic Survey of Canada).....	49	05	38.907	16	04	44.78	196	00	24.61	Cherry.....	25,368.33	4.4042918
	108	51	32.587	107	14	59.65	286	58	38.92	Old Man.....	27,510.34	4.4394960
Claydon (Geodetic Survey of Canada).....	49	19	03.681	5	27	44.63	185	24	49.97	Cherry.....	49,464.64	4.6942948
	108	53	26.318	55	06	40.09	234	51	43.85	Old Man.....	29,221.12	4.4656969
				354	41	51.34	174	43	17.44	Lucky.....	24,968.01	4.3973840
Alkali (Geodetic Survey of Canada).....	48	58	05.449	68	47	52.32	248	31	29.22	Cherry.....	28,504.45	4.4549127
	108	35	33.222	125	48	33.73	305	36	29.35	Lucky.....	24,000.19	4.3802147
				150	53	01.02	330	39	29.39	Claydon.....	44,540.86	4.6487586
Rapdan (Geodetic Survey of Canada).....	49	13	05.741	1	22	17.16	181	21	52.42	Alkali.....	27,819.83	4.4443544
	108	35	00.486	55	37	40.95	235	25	10.43	Lucky.....	24,385.49	4.3871315
				116	26	02.61	296	12	04.65	Claydon.....	24,941.68	4.3969257
Center (Geodetic Survey of Canada).....	49	05	45.334	31	14	40.64	211	09	20.82	Alkali.....	16,608.92	4.2203414
	108	28	29.657	149	50	21.19	329	45	25.53	Rapdan.....	15,742.10	4.1970626
Climax (Geodetic Survey of Canada).....	49	12	09.393	34	02	38.39	213	51	44.64	Alkali.....	31,430.13	4.4973462
	108	21	08.115	37	04	09.67	216	58	35.68	Center.....	14,860.45	4.1720318
				95	59	11.66	275	48	41.46	Rapdan.....	16,937.18	4.2288411
Big Butte (Geodetic Survey of Canada).....	48	57	29.607	93	21	07.23	273	09	04.55	Alkali.....	19,520.17	4.2904835
	108	19	35.126	144	42	55.97	324	36	12.38	Center.....	18,773.21	4.2735386
				176	02	16.53	356	01	06.26	Climax.....	27,243.81	4.4352678
Edmund (Geodetic Survey of Canada).....	49	10	18.276	32	27	58.83	212	18	38.27	Big Butte.....	28,120.15	4.4490177
	108	07	13.108	101	33	48.55	281	23	16.57	Climax.....	17,253.72	4.2368828
Porter (Geodetic Survey of Canada).....	48	55	49.589	98	27	44.38	278	14	44.69	Big Butte.....	21,265.78	4.3276813
	108	02	21.151	143	02	11.42	322	48	00.03	Climax.....	37,940.43	4.5791023
				167	34	24.01	347	30	43.50	Edmund.....	27,482.41	4.4390547
Roche (Geodetic Survey of Canada).....	49	11	11.321	23	22	11.10	203	14	34.70	Porter.....	31,003.91	4.4914165
	107	52	16.955	84	56	06.49	264	44	48.32	Edmund.....	18,223.75	4.2606378
Monchy (Geodetic Survey of Canada).....	49	00	42.938	62	00	39.69	241	50	09.55	Porter.....	19,254.22	4.2845259
	107	48	25.843	127	58	11.24	307	43	59.30	Edmund.....	28,964.87	4.4618716
				166	26	47.68	346	23	53.00	Roche.....	19,970.19	4.3003823
70 Mile Butte (Geodetic Survey of Canada).....	49	11	46.545	29	07	09.54	209	00	05.01	Monchy.....	23,452.74	4.3701936
	107	39	04.226	86	12	17.93	266	02	17.92	Roche.....	16,068.14	4.2065060
Whitewater (Geodetic Survey of Canada).....	48	59	43.496	96	06	48.12	275	56	01.93	Monchy.....	17,497.95	4.2429872
	107	34	09.674	134	02	25.22	313	48	43.52	Roche.....	30,628.89	4.4861313
				165	03	12.52	344	59	29.90	70 Mile Butte.....	23,121.97	4.3640249

## GEORGIA STRAIT TO LAKE OF THE WOODS, FIRST-ORDER SCHEME—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	"	°	'	"	°	'	"			
Long.....	48	57	24.252	101	36	59.34	281	23	55.53	Whitewater.....	21,561.07	4.3336704
	107	16	50.739	134	41	10.01	314	24	22.45	70 Mile Butte.....	37,973.45	4.5794800
Wideview (Geodetic Survey of Canada)...	49	17	25.075	3	40	12.80	183	38	44.36	Long.....	37,171.82	4.5702138
	107	14	53.774	35	39	45.42	215	25	11.16	Whitewater.....	40,303.13	4.6053388
				70	31	58.93	250	13	40.23	70 Mile Butte.....	31,146.48	4.4934090
Blum (Geodetic Survey of Canada).....	49	08	21.742	22	34	21.01	202	29	07.65	Long.....	21,989.13	4.3422081
	107	09	55.841	160	16	16.82	340	12	31.23	Wideview.....	17,835.22	4.2512784
Peaked Butte (Geodetic Survey of Canada)...	49	10	42.778	53	12	57.26	232	52	36.84	Long.....	41,033.21	4.6131355
	106	49	55.328	79	58	15.59	259	43	07.29	Blum.....	24,711.19	4.3928936
				112	26	59.20	292	08	04.29	Wideview.....	32,763.08	4.5153848
Thoeny (Geodetic Survey of Canada).....	48	53	02.954	103	31	56.80	283	10	58.15	Long.....	34,938.36	4.5433025
	106	49	01.008	138	11	38.67	317	55	51.46	Blum.....	38,155.31	4.5815550
				178	04	31.43	358	03	50.41	Peaked Butte.....	32,758.42	4.5153230
Clay Butte (Geodetic Survey of Canada)...	49	10	31.333	25	04	49.28	204	55	27.89	Thoeny.....	35,734.97	4.5530934
	106	36	37.503	91	20	13.92	271	10	10.17	Peaked Butte.....	16,163.04	4.2085232
Roanwood (Geodetic Survey of Canada)...	48	55	00.489	80	18	32.15	260	05	34.32	Thoeny.....	21,333.26	4.3290573
	106	31	48.827	142	57	12.37	322	43	31.77	Peaked Butte.....	36,525.61	4.5625974
				168	30	27.07	348	26	49.05	Clay Butte.....	29,346.96	4.4675631
Glentana (Geodetic Survey of Canada)...	48	53	17.470	101	15	32.96	281	05	36.96	Roanwood.....	16,418.30	4.2153283
	106	18	37.945	145	38	19.31	325	24	44.16	Clay Butte.....	38,741.64	4.5881780
Table Butte (Geodetic Survey of Canada)...	49	07	07.495	5	33	00.09	185	31	27.79	Glentana.....	25,761.01	4.4106929
	106	16	35.644	39	39	32.04	219	28	02.67	Roanwood.....	29,131.83	4.4643677
				104	37	17.37	284	22	08.39	Clay Butte.....	25,157.97	4.4006755
Richland (Geodetic Survey of Canada)...	48	55	05.552	81	03	51.23	260	50	55.00	Glentana.....	21,241.10	4.3271771
	106	01	27.916	140	30	15.45	320	18	50.18	Table Butte.....	28,940.47	4.4615055
Quantock (Geodetic Survey of Canada)...	49	10	50.733	67	04	19.42	246	54	13.33	Table Butte.....	17,641.08	4.2465252
	106	03	14.404	355	45	12.20	175	46	32.62	Richland.....	29,278.32	4.4665461
Templeman (Geodetic Survey of Canada)...	48	50	31.408	99	30	50.34	279	11	39.54	Glentana.....	31,560.49	4.4991438
	105	53	10.008	129	54	22.04	309	48	06.94	Richland.....	13,214.91	4.1210642
				162	00	12.50	341	52	36.28	Quantock.....	39,618.79	4.5979012
Fife Lake (Geodetic Survey of Canada)...	49	08	45.802	11	14	39.72	191	10	31.00	Templeman.....	34,465.05	4.5373789
	105	47	40.418	33	38	44.87	213	28	20.04	Richland.....	30,407.30	4.4829779
				101	37	34.12	281	25	47.49	Quantock.....	19,311.72	4.2858210
Poplar (Geodetic Survey of Canada).....	49	01	20.966	47	43	15.42	227	29	41.22	Templeman.....	29,761.99	4.4736619
	105	35	10.073	132	08	46.02	311	59	19.00	Fife Lake.....	20,510.16	4.3119691
Eddyside (Geodetic Survey of Canada)...	49	06	52.875	52	13	43.18	231	49	41.92	Templeman.....	49,277.02	4.6926445
	105	21	19.704	58	46	26.55	238	35	59.21	Poplar.....	19,728.72	4.2950990
				96	22	43.94	276	02	48.60	Fife Lake.....	32,235.19	4.5083303
Madoc (Geodetic Survey of Canada).....	48	48	27.902	95	26	25.07	275	00	45.98	Templeman.....	41,881.60	4.6220232
	105	19	05.250	140	39	36.25	320	27	29.03	Poplar.....	30,922.41	4.4902733
				175	25	58.65	355	24	17.24	Eddyside.....	34,243.53	4.5345785
Whitetail (Geodetic Survey of Canada)...	48	57	03.873	24	10	05.06	204	05	41.07	Madoc.....	17,465.09	4.2421708
	105	13	14.811	151	37	23.41	331	31	17.28	Eddyside.....	20,690.14	4.3157634
Flaxville (Geodetic Survey of Canada)...	48	46	01.180	106	56	50.78	286	47	40.01	Madoc.....	15,616.98	4.1935971
	105	06	53.110	155	34	24.37	335	23	30.93	Eddyside.....	42,498.19	4.6283704
				159	13	47.32	339	08	59.86	Whitetail.....	21,899.81	4.3404404
Mervin (Geodetic Survey of Canada).....	49	01	59.777	10	23	23.70	190	20	03.36	Flaxville.....	30,103.02	4.4786101
	105	02	27.256	55	17	34.68	235	09	26.02	Whitetail.....	16,026.75	4.2048454
				111	37	12.75	291	22	57.12	Eddyside.....	24,703.32	4.3927553
Ross (Geodetic Survey of Canada).....	48	59	49.962	45	39	01.66	225	22	57.77	Flaxville.....	36,537.25	4.5627359
	104	45	33.660	101	07	27.23	280	54	42.08	Mervin.....	20,983.00	4.3218676
Plentywood (Geodetic Survey of Canada)...	48	43	07.816	101	00	29.93	280	43	23.35	Flaxville.....	28,408.51	4.4534484
	104	44	07.546	147	27	42.51	327	13	54.11	Mervin.....	41,531.16	4.6183741
				176	45	49.45	356	44	44.60	Ross.....	31,006.84	4.4914575
Bruce (Geodetic Survey of Canada).....	48	56	41.865	28	55	12.14	208	46	40.83	Plentywood.....	28,709.51	4.4580258
	104	32	48.321	110	33	03.26	290	23	25.91	Ross.....	16,614.56	4.2204887
Dooley (Geodetic Survey of Canada).....	48	51	42.107	58	33	14.38	238	17	21.79	Plentywood.....	30,337.48	4.4819795
	104	23	01.326	118	50	29.93	298	33	30.40	Ross.....	31,381.91	4.4966794
				127	49	21.15	307	41	58.78	Bruce.....	15,121.27	4.1795883
Tangedal (Geodetic Survey of Canada)...	49	04	18.911	7	04	25.83	187	02	38.47	Dooley.....	23,557.29	4.3721254
	104	20	38.995	46	28	04.65	226	18	54.15	Bruce.....	20,470.26	4.3111234
				74	51	06.64	254	32	18.01	Ross.....	31,476.01	4.4979797
Trees (Geodetic Survey of Canada).....	49	04	20.474	47	28	16.23	227	12	33.35	Dooley.....	34,571.15	4.5387138
	104	02	11.383	89	59	35.53	269	45	38.68	Tangedal.....	22,481.01	4.3518157
Alkabo (Geodetic Survey of Canada).....	48	52	19.176	88	22	10.80	267	59	55.89	Dooley.....	36,139.10	4.5579773
	103	53	28.975	124	01	11.34	303	40	41.66	Tangedal.....	39,916.06	4.6011477
				154	33	43.13	334	27	09.03	Trees.....	24,085.28	4.3924380
Agate (Geodetic Survey of Canada).....	49	01	29.351	11	18	06.17	191	16	00.48	Alkabo.....	17,330.65	4.2388149
	103	50	42.307	110	46	06.28	290	37	25.84	Trees.....	14,957.89	4.1748702

## GEORGIA STRAIT TO LAKE OF THE WOODS, FIRST-ORDER SCHEME—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	''	°	'	''	°	'	''			
Norge (U. S. C. & G. S.).....	48 53 38.110			72 00 49.06			251 56 11.97			Alkabo.....	7,880.17	3.8965356
	103 47 21.176			137 43 23.84			317 32 12.16			Trees.....	26,858.83	4.4290870
				164 19 19.98			344 16 48.28			Agate.....	15,121.33	4.1795901
Pole (Geodetic Survey of Canada).....	48 57 53.287			9 37 47.00			189 36 57.50			Norge.....	7,965.23	3.9028308
	103 46 15.516			140 55 56.49			320 52 35.16			Agate.....	8,600.15	3.9345063
Messers (Geodetic Survey of Canada).....	49 01 54.162			31 02 02.08			210 56 20.84			Norge.....	17,874.64	4.2522373
	103 39 48.770			46 36 50.34			226 31 58.47			Pole.....	10,824.46	4.0344064
				86 45 51.97			266 37 38.53			Agate.....	13,298.48	4.1238020
Ambrose (U. S. C. & G. S.).....	48 54 47.703			83 59 46.99			263 47 23.45			Norge.....	20,208.05	4.3055243
	103 30 54.531			107 06 13.62			286 54 39.19			Pole.....	19,600.08	4.2922579
				140 32 32.32			320 25 49.29			Messers.....	17,076.31	4.2323941
Crosby (U. S. C. & G. S.).....	48 51 33.579			102 52 09.59			282 41 42.73			Norge.....	17,387.20	4.2402298
	103 33 29.017			207 40 33.04			27 42 29.43			Ambrose.....	6,772.40	3.8307424
Ambrose southwest base (U. S. C. & G. S.).....	48 57 06.622			63 00 10.61			242 52 23.75			Norge.....	14,157.89	4.1509985
	103 37 01.856			299 49 00.97			119 53 37.91			Ambrose.....	8,620.44	3.9355266
				337 07 55.28			157 10 35.68			Crosby.....	11,163.80	4.0478121
Ambrose northeast base (U. S. C. & G. S.)=School.....	48 59 23.575			13 57 50.22			193 56 31.73			Ambrose.....	8,781.15	3.9435512
	103 29 10.462			66 14 17.93			246 08 22.32			Ambrose southwest base.....	10,479.18	4.0203272
Bowie (U. S. C. & G. S.).....	48 59 55.870			19 16 10.70			199 13 39.69			Norge.....	12,360.50	4.0920360
	103 44 00.917			273 03 40.60			93 14 52.58			School.....	18,129.03	4.2583745
				300 40 19.84			120 50 12.94			Ambrose.....	18,616.35	4.2698945
				301 29 07.04			121 34 23.19			Ambrose southwest base.....	9,998.08	3.9999167
				320 16 36.33			140 24 32.72			Crosby.....	20,154.31	4.3043680
Schnell (Geodetic Survey of Canada).....	49 03 25.072			7 23 04.71			187 21 47.96			Ambrose.....	16,115.57	4.2072458
	103 29 12.803			77 47 56.36			257 39 56.07			Messers.....	13,217.10	4.1211361
Hansen (Geodetic Survey of Canada).....	48 56 16.562			68 16 47.73			248 12 33.01			Ambrose.....	7,405.83	3.8695739
	103 25 16.635			120 33 08.19			300 22 10.14			Messers.....	20,571.97	4.3132759
				160 05 28.26			340 02 30.03			Schnell.....	14,080.96	4.1486322
Gardner (Geodetic Survey of Canada).....	49 06 39.659			33 16 19.31			213 08 31.10			Hansen.....	23,005.35	4.3618289
	103 14 56.478			71 00 26.89			250 49 39.80			Schnell.....	18,386.87	4.2645079
Peterson (Geodetic Survey of Canada).....	48 55 42.300			94 43 49.36			274 35 48.75			Hansen.....	13,017.63	4.1145319
	103 14 39.170			128 55 23.68			308 44 24.42			Schnell.....	22,798.95	4.3579148
				179 00 34.99			359 00 21.92			Gardner.....	20,309.99	4.3077097
Estevan (Geodetic Survey of Canada).....	49 07 18.331			48 13 55.33			227 59 04.51			Peterson.....	32,201.19	4.5078719
	102 54 59.267			87 18 31.00			267 03 25.86			Gardner.....	24,307.29	4.3857366
Cook (Geodetic Survey of Canada).....	48 49 51.057			113 34 06.75			293 18 41.49			Peterson.....	27,276.22	4.4357842
	102 54 10.939			141 01 05.55			320 45 25.94			Gardner.....	40,155.44	4.6037443
				178 15 54.17			358 15 17.71			Estevan.....	32,366.75	4.5100991
Dunbar (Geodetic Survey of Canada).....	49 02 24.712			36 28 49.36			216 18 13.67			Cook.....	28,921.72	4.4612241
	102 40 07.820			116 43 21.96			296 32 08.35			Estevan.....	20,236.91	4.3061442
Short Creek (Geodetic Survey of Canada).....	48 58 30.439			33 36 28.19			213 29 54.44			Cook.....	19,252.19	4.2844802
	102 45 28.446			144 39 17.18			324 32 06.06			Estevan.....	20,007.37	4.3011900
				221 57 56.39			42 01 58.40			Dunbar.....	9,738.29	3.9884826
Lignite (Geodetic Survey of Canada).....	48 52 36.556			79 02 38.87			258 46 35.38			Cook.....	26,579.15	4.4245410
	102 32 51.462			125 25 56.29			305 16 25.63			Short Creek.....	18,893.23	4.2763062
				154 00 24.53			333 54 55.42			Dunbar.....	20,221.47	4.3058128
Spy (Geodetic Survey of Canada).....	49 01 26.430			49 00 21.94			228 48 46.23			Lignite.....	24,904.42	4.3962764
	102 17 28.948			93 52 27.90			273 35 21.85			Dunbar.....	27,661.52	4.4418760
Portal (Geodetic Survey of Canada).....	48 59 56.215			117 50 16.82			297 44 53.45			Dunbar.....	9,838.17	3.9929142
	102 32 59.474			261 31 06.91			81 42 49.31			Spy.....	19,113.93	4.2813499
				359 18 40.67			179 18 46.71			Lignite.....	13,582.56	4.1329817
Flaxton (Geodetic Survey of Canada).....	48 54 07.525			80 16 41.17			260 06 39.79			Lignite.....	16,500.66	4.2175013
	102 19 33.291			123 22 35.97			303 12 27.99			Portal.....	19,623.38	4.2927737
				190 33 14.11			10 34 47.90			Spy.....	13,792.27	4.1396357
McGillivray (Geodetic Survey of Canada).....	48 54 31.984			88 04 29.00			267 51 21.94			Flaxton.....	21,281.35	4.3279991
	102 02 08.932			124 28 30.23			304 16 56.24			Spy.....	22,673.46	4.3555178
Martin (Geodetic Survey of Canada).....	49 02 19.333			49 53 01.79			229 41 55.17			Flaxton.....	23,533.46	4.3716857
	102 04 49.612			84 01 54.06			263 52 20.71			Spy.....	15,511.02	4.1906404
				347 13 46.54			167 15 47.76			McGillivray.....	14,902.27	4.1703282
Bluel (Geodetic Survey of Canada).....	48 55 26.067			82 38 19.64			262 30 25.18			McGillivray.....	12,924.55	4.1114153
	101 51 39.461			128 33 10.40			308 23 14.24			Martin.....	20,521.20	4.3122028
Goertz (Geodetic Survey of Canada).....	49 03 54.460			7 21 45.25			187 20 30.02			Bluel.....	15,835.24	4.1996246
	101 49 59.779			40 32 48.44			220 23 38.25			McGillivray.....	22,840.49	4.3587055
				80 51 19.58			260 40 07.49			Martin.....	18,305.49	4.2625813
Harris (Geodetic Survey of Canada).....	49 03 20.240			49 13 06.54			229 02 38.21			Bluel.....	22,386.15	4.3499795
	101 37 46.782			94 08 24.88			273 59 11.18			Goertz.....	14,918.49	4.1737248
Trout (Geodetic Survey of Canada).....	48 53 10.240			104 51 58.50			284 42 10.18			Bluel.....	16,442.37	4.2159644
	101 38 38.799			145 14 18.27			325 05 44.52			Goertz.....	24,245.08	4.3846237
				183 12 28.35			3 13 07.59			Harris.....	18,873.46	4.2758515

## GEORGIA STRAIT TO LAKE OF THE WOODS, FIRST-ORDER SCHEME—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	''	°	'	''	°	'	''			
Gainsborough (Geodetic Survey of Canada).....	49	02	42.081	44	23	59.15	224	13	19.61	Trout.....	24,686.89	4.3924663
	101	24	30.965	94	15	20.68	274	05	19.61	Harris.....	16,202.53	4.2095828
Mohall (Geodetic Survey of Canada).....	48	53	32.275	87	51	01.82	267	40	17.90	Trout.....	17,423.36	4.2411318
	101	24	24.157	138	08	19.50	317	58	13.99	Harris.....	24,419.87	4.3877434
				179	32	01.10	359	31	55.97	Gainsborough.....	16,984.85	4.2300618
Lyleton (Geodetic Survey of Canada).....	49	03	41.630	41	57	03.21	221	46	37.40	Mohall.....	25,276.01	4.4027084
	101	10	34.658	83	54	17.40	283	43	45.73	Gainsborough.....	17,080.09	4.2324903
Westhope (Geodetic Survey of Canada).....	48	54	19.391	86	04	48.80	265	52	03.80	Mohall.....	20,730.21	4.3166038
	101	07	28.849	126	52	11.14	306	39	20.03	Gainsborough.....	25,946.11	4.4140722
				167	44	50.84	347	42	30.64	Lyleton.....	17,774.56	4.2497988
Hayden (Geodetic Survey of Canada).....	49	03	57.282	32	51	26.93	212	44	20.02	Westhope.....	21,236.78	4.3270887
	100	58	03.082	88	15	57.76	268	06	29.97	Lyleton.....	15,265.19	4.1837022
Malme (Geodetic Survey of Canada).....	48	56	01.906	78	54	26.64	258	44	33.12	Westhope.....	16,339.95	4.2132507
	100	54	21.469	125	46	35.69	305	34	21.23	Lyleton.....	24,351.92	4.3865332
				162	58	15.54	342	55	28.30	Hayden.....	15,359.76	4.1863843
Souris (Geodetic Survey of Canada).....	48	57	06.865	79	09	58.47	259	03	31.88	Malme.....	10,624.09	4.0262918
	100	45	48.782	130	25	39.25	310	16	25.01	Hayden.....	19,580.74	4.2918292
Temple (Geodetic Survey of Canada).....	49	04	46.181	8	02	02.30	188	00	47.99	Souris.....	14,329.30	4.1562251
	100	44	10.350	37	32	51.57	217	25	10.31	Malme.....	20,409.75	4.3098376
				84	58	40.53	264	48	11.38	Hayden.....	16,968.60	4.2296460
Johnson (Geodetic Survey of Canada).....	48	58	17.747	84	01	09.94	263	48	28.49	Souris.....	20,651.71	4.3149561
	100	28	59.264	123	03	00.99	302	51	33.12	Temple.....	22,058.61	4.3435782
Declercq (Geodetic Survey of Canada).....	49	04	44.386	53	53	35.04	233	41	37.80	Souris.....	23,926.89	4.3788862
	100	29	58.655	90	16	23.32	270	05	39.77	Temple.....	17,284.27	4.2376511
				354	13	31.01	174	14	15.85	Johnson.....	12,004.74	4.0793529
Scott (Geodetic Survey of Canada).....	49	04	02.496	64	17	16.36	244	03	38.75	Johnson.....	24,446.79	4.3882218
	100	10	56.239	93	18	51.22	273	04	28.07	Declercq.....	23,222.96	4.3659175
Summit.....	48	59	57.764	51	46	12.82	231	43	47.37	Johnson.....	4,990.63	3.6981552
	100	25	46.503	149	58	53.86	329	55	43.44	Declercq.....	10,228.67	4.0098192
				247	13	05.57	67	24	17.80	Scott.....	19,600.29	4.2922625
Olie (Geodetic Survey of Canada).....	48	53	03.883	116	03	49.55	295	51	32.04	Johnson.....	22,147.98	4.3453342
	100	12	40.998	128	44	10.85	308	34	18.54	Summit.....	20,468.98	4.3110961
				185	57	59.93	5	59	18.96	Scott.....	20,456.75	4.3108367
Dunseith (Geodetic Survey of Canada).....	48	55	30.076	73	40	17.29	253	30	49.74	Olie.....	15,988.03	4.2037950
	100	00	07.890	140	17	14.99	320	09	05.70	Scott.....	20,597.80	4.3138208
Ninga H (Geodetic Survey of Canada).....	49	01	51.253	0	59	22.39	180	59	14.85	Dunseith.....	11,776.87	4.0710298
	99	59	57.899	43	41	55.22	223	32	19.67	Olie.....	22,503.26	4.3522454
				106	56	25.84	286	48	08.61	Scott.....	13,969.64	4.1451852
Ram (Geodetic Survey of Canada).....	49	11	57.173	28	38	47.53	208	32	27.16	Ninga H.....	21,318.26	4.3287517
	99	51	34.784	58	12	26.01	237	57	47.67	Scott.....	27,737.83	4.4430725
St. John (Geodetic Survey of Canada).....	48	54	19.836	96	45	37.96	276	34	10.58	Dunseith.....	18,694.44	4.2717124
	99	44	55.928	127	20	03.22	307	08	42.83	Ninga H.....	23,043.60	4.3625504
Lena (Geodetic Survey of Canada).....	49	01	16.215	24	50	13.31	204	46	32.85	St. John.....	14,169.97	4.1513689
	99	40	03.659	92	40	46.75	272	25	45.09	Ninga H.....	24,285.75	4.3853516
				144	46	39.86	324	37	57.39	Ram.....	24,259.75	4.3848863
Killarney (Geodetic Survey of Canada).....	49	10	21.685	56	07	45.13	235	53	13.74	Ninga H.....	28,204.27	4.4503149
	99	40	45.076	102	42	19.60	282	34	07.88	Ram.....	13,483.46	4.1298012
				357	08	28.03	177	08	59.33	Lena.....	16,871.66	4.2271578
Margaret (N. W. Base) (Geodetic Survey of Canada).....	49	21	27.071	12	32	35.34	192	27	34.25	Ninga H.....	37,206.25	4.5706159
	99	53	20.125	323	19	16.80	143	28	48.92	Killarney.....	25,604.27	4.4083124
Fairhall (S. E. Base) (Geodetic Survey of Canada).....	49	17	14.897	7	21	52.10	187	20	50.41	Killarney.....	12,871.20	4.1096192
	99	39	23.626	41	21	44.58	221	06	10.81	Ninga H.....	37,941.54	4.5791149
				114	50	45.76	294	40	11.37	Margaret.....	18,602.61	4.2695739
Mowbray (Geodetic Survey of Canada).....	49	09	53.682	58	46	35.57	238	30	18.43	Lena.....	30,717.77	4.4873896
	99	18	30.765	91	58	24.13	271	41	34.54	Killarney.....	27,043.46	4.4320623
Holmfild (Geodetic Survey of Canada).....	49	07	04.559	51	37	06.93	231	28	42.51	Lena.....	17,304.82	4.2381670
	99	28	56.001	113	02	22.12	292	53	25.80	Killarney.....	15,607.81	4.1933421
				247	31	45.44	67	39	38.32	Mowbray.....	13,707.36	4.1369539
Taylor (Geodetic Survey of Canada).....	49	00	56.380	91	32	55.54	271	17	37.99	Lena.....	24,703.44	4.3927575
	99	19	48.231	135	42	21.76	315	35	27.94	Holmfild.....	15,905.93	4.2015591
				185	24	04.45	5	25	03.00	Mowbray.....	16,672.63	4.2220041
Clearwater (Geodetic Survey of Canada).....	49	08	39.658	44	34	52.20	224	26	08.38	Taylor.....	20,068.18	4.3025080
	99	08	15.003	100	27	01.39	280	19	15.59	Mowbray.....	12,685.10	4.1032938
Sarles (Geodetic Survey of Canada).....	48	58	28.525	103	38	55.92	283	27	12.42	Taylor.....	19,492.93	4.2898772
	99	04	16.012	140	44	53.85	320	34	08.09	Mowbray.....	27,367.84	4.4372406
				165	36	42.38	345	33	41.85	Clearwater.....	19,492.57	4.2898692
Fallison (Geodetic Survey of Canada).....	48	58	04.646	93	16	38.74	273	08	30.81	Sarles.....	13,175.12	4.1197546
	98	53	29.214	137	34	42.91	317	23	33.83	Clearwater.....	26,613.04	4.4250945

## GEORGIA STRAIT TO LAKE OF THE WOODS, FIRST-ORDER SCHEME—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	"	°	'	"	°	'	"			
Pilot Mound (Geodetic Survey of Canada)...	49 13 28.870	98 54 42.839		22 44 49.19	61 34 24.03	356 59 51.64	202 37 35.95	241 24 09.37	177 00 47.28	Sarles..... Clearwater..... Fallison.....	30, 146. 06 18, 717. 19 28, 590. 30	4. 4792306 4. 2722405 4. 4562188
Star Mound (Geodetic Survey of Canada).....	49 03 34.519	98 43 20.363		50 18 28.65	69 42 43.92	143 19 14.08	230 10 53.57	249 27 00.55	323 10 42.44	Fallison..... Sarles..... Pilot Mound.....	15, 934. 62 27, 094. 24 22, 915. 35	4. 2023416 4. 4328769 4. 3601265
Manitou (Geodetic Survey of Canada).....	49 15 28.269	98 33 16.266		29 20 24.54	82 04 05.77		209 12 42.99	261 47 51.24		Star Mound..... Pilot Mound.....	25, 278. 18 26, 284. 60	4. 4027458 4. 4197014
Maida (Geodetic Survey of Canada).....	48 58 21.902	98 24 10.854		112 28 43.49	127 12 19.08	160 49 35.52	292 14 11.20	306 49 14.39	340 42 43.17	Star Mound..... Pilot Mound..... Manitou.....	25, 387. 90 46, 541. 71 33, 580. 53	4. 4046268 4. 6678423 4. 5260675
Cavers (Geodetic Survey of Canada).....	48 57 34.337	98 36 42.535		143 37 50.65	187 09 55.55	204 25 54.12	323 32 45.83	7 12 31.48	84 35 21.13	Star Mound..... Manitou..... Maida.....	13, 825. 74 33, 438. 84 15, 359. 57	4. 1406885 4. 5242512 4. 1863790
Kaleida (Geodetic Survey of Canada).....	49 07 07.536	98 29 12.924		27 19 39.36	162 21 23.89	339 16 22.11	207 13 59.83	342 18 19.71	159 20 10.24	Cavers..... Manitou..... Maida.....	19, 923. 13 16, 254. 81 17, 357. 87	4. 2993575 4. 2104471 4. 2394964
Darlingford (Geodetic Survey of Canada).....	49 14 18.964	98 22 54.725		2 59 51.61	29 55 35.43	99 43 52.48	182 58 54.06	209 50 49.23	279 35 01.63	Maida..... Kaleida..... Manitou.....	29, 606. 02 15, 372. 24 12, 751. 66	4. 4713800 4. 1867372 4. 1055667
Numedahl (Geodetic Survey of Canada).....	49 01 13.955	98 07 32.970		75 25 19.10	142 28 46.90		255 12 46.03	322 17 09.88		Maida..... Darlingford.....	20, 969. 25 30, 615. 42	4. 3215829 4. 4859402
North Star (Geodetic Survey of Canada).....	49 05 34.514	98 14 03.112		42 47 36.60	146 26 32.89	315 25 07.07	222 39 57.71	326 19 50.68	135 30 01.77	Maida..... Darlingford..... Numedahl.....	18, 193. 34 19, 454. 51 11, 293. 04	4. 2599125 4. 2890203 4. 0528107
Morden (Geodetic Survey of Canada).....	49 11 33.549	98 01 05.381		22 22 09.94	54 57 00.44	101 03 10.04	202 17 16.95	234 47 12.21	280 46 38.65	Numedahl..... North Star..... Darlingford.....	20, 692. 12 19, 274. 14 26, 987. 04	4. 3158050 4. 2849750 4. 4311553
Plum Coulee (Geodetic Survey of Canada).....	49 08 30.221	97 45 10.787		63 48 51.61	106 25 25.45		243 31 57.40	286 13 23.18		Numedahl..... Morden.....	30, 388. 94 20, 150. 45	4. 4827156 4. 3042847
Walhalla (Geodetic Survey of Canada).....	48 54 09.709	97 53 56.677		128 22 05.24	164 56 12.54	201 50 30.83	308 11 49.53	344 50 48.75	21 57 07.86	Numedahl..... Morden..... Plum Coulee.....	21, 153. 60 33, 400. 62 28, 649. 57	4. 3253844 4. 5237545 4. 4571181
Nече (Geodetic Survey of Canada).....	48 59 30.382	97 32 18.068		69 35 07.62	136 50 07.96		249 18 48.33	316 40 24.19		Walhalla..... Plum Coulee.....	28, 219. 36 22, 894. 16	4. 4505471 4. 3597247
Altona (Geodetic Survey of Canada).....	49 07 00.974	97 30 22.361		9 28 06.10	50 16 21.33	98 13 09.33	189 26 38.70	229 58 33.75	278 01 57.50	Nече..... Walhalla..... Plum Coulee.....	14, 299. 30 37, 451. 21 18, 193. 84	4. 1553147 4. 5734658 4. 2599243
Pembina (Geodetic Survey of Canada).....	48 57 49.854	97 17 32.242		99 52 27.15	137 48 59.61		279 41 18.83	317 39 18.03		Nече..... Altona.....	18, 279. 15 23, 255. 69	4. 2619550 4. 3665292
Letellier (Geodetic Survey of Canada).....	49 07 07.424	97 16 40.155		3 31 11.68	53 32 40.10	90 02 18.08	183 30 32.35	233 20 51.66	259 51 57.04	Pembina..... Nече..... Altona.....	17, 256. 80 23, 706. 13 16, 672. 53	4. 2369602 4. 3748606 4. 2220016
Ridgeville (Geodetic Survey of Canada).....	49 04 26.944	96 58 57.736		61 40 21.12	103 03 54.36		241 26 19.75	282 50 31.37		Pembina..... Letellier.....	25, 753. 99 22, 115. 95	4. 4108446 4. 3447059
States (U. S. C. & G. S.).....	49 00 01.447	97 07 39.343		71 25 41.72	140 12 59.46	232 11 59.68	251 18 14.37	320 06 10.93	52 18 33.50	Pembina..... Letellier..... Ridgeville.....	12, 722. 57 17, 138. 11 13, 398. 05	4. 1045750 4. 2339628 4. 1270415
Humboldt (Geodetic Survey of Canada).....	48 50 51.431	97 06 59.493		135 09 17.35	177 16 14.10	201 12 20.95	315 01 20.49	357 15 44.06	21 18 24.32	Pembina..... States..... Ridgeville.....	18, 251. 24 17, 010. 00 27, 031. 29	4. 2612923 4. 2307043 4. 4318667
Canada (U. S. C. & G. S.).....	49 00 00.967	96 53 13.184		44 49 28.19	90 08 20.68	139 36 51.54	224 39 05.29	269 57 26.98	319 32 31.36	Humboldt..... States..... Ridgeville.....	23, 898. 34 17, 605. 56 10, 792. 85	4. 3783677 4. 2456498 4. 0331360
Tolstoi (Geodetic Survey of Canada).....	49 04 25.533	96 48 30.513		90 15 43.1			270 07 49.2			Ridgeville.....	12, 730. 20	4. 1048353
Stuartburn (Geodetic Survey of Canada).....	49 04 24.733	96 42 35.875		90 14 02.0			270 09 34.0			Tolstoi.....	7, 197. 82	3. 8572010
Vita (Geodetic Survey of Canada).....	49 08 02.525	96 37 50.059		40 46 50.7			220 43 14.6			Stuartburn.....	8, 881. 31	3. 9484770
Read (Geodetic Survey of Canada).....	49 08 00.821	96 32 17.113		90 28 54.4			270 24 42.6			Vita.....	6, 749. 57	3. 8292762
Ingram (Geodetic Survey of Canada).....	49 08 01.032	96 29 30.529		89 54 25.3			269 52 19.3			Read.....	3, 376. 94	3. 5285237
Caliento (Geodetic Survey of Canada).....	49 08 03.180	96 24 39.061		89 23 13.9			269 19 33.5			Ingram.....	5, 908. 49	3. 7714766
Menisino (Geodetic Survey of Canada).....	49 05 06.889	96 08 24.433		105 30 19.8			285 18 03.0			Caliento.....	20, 503. 76	4. 3111334

## GEORGIA STRAIT TO LAKE OF THE WOODS, FIRST-ORDER SCHEME—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Piney.....	49 04 43.539 96 05 30.460	101 33 56.4 104 56 52.9	281 31 44.9 284 42 24.6	Menisino..... Caliento.....	3,603.34 24,099.72	3.5567049 4.38-0120
Fast (Geodetic Survey of Canada).....	49 04 28.703 96 01 46.960	95 47 35.6	275 44 46.7	Piney.....	4,559.01	3.6588706
McQuade (Geodetic Survey of Canada).....	49 04 29.578 95 58 32.922	89 37 37.2	269 35 10.6	Fast.....	3,938.24	3.5953017
Slow (Geodetic Survey of Canada).....	49 03 34.010 95 54 41.916	110 07 51.5	290 04 57.0	McQuade.....	4,993.48	3.6984032
Gullbault (Geodetic Survey of Canada).....	49 02 48.698 95 53 12.432	103 23 56.6 115 37 35.9 127 37 13.9	283 14 39.1 295 33 33.8 307 36 06.3	Piney..... McQuade..... Slow.....	15,396.67 7,214.20 2,293.60	4.1874269 3.8581882 3.3605173
South Junction (Geodetic Survey of Canada).....	49 02 24.616 95 45 45.244	94 43 47.7	274 38 10.0	Gullbault.....	9,112.11	3.9596189
Swamp (Geodetic Survey of Canada).....	49 01 59.995 95 44 11.458	111 46 32.0	291 45 21.2	South Junction.....	2,051.13	3.3119933
Tod (Geodetic Survey of Canada).....	49 02 13.393 95 42 07.079	80 42 31.6	260 40 57.7	Swamp.....	2,560.04	3.4082475
Soft (Geodetic Survey of Canada).....	49 02 35.667 95 41 07.054	60 33 53.8	240 33 08.4	Tod.....	1,399.90	3.1460958
Sprague (Geodetic Survey of Canada).....	49 02 08.789 95 39 05.579	108 36 47.5	288 35 15.8	Soft.....	2,603.14	3.4154971
Rita (Geodetic Survey of Canada).....	49 01 46.898 95 34 23.969	96 46 18.7	276 42 40.1	Sprague.....	5,760.13	3.7604323
Middleboro (Geodetic Survey of Canada).....	49 01 07.731 95 26 24.160	97 07 32.5	277 01 30.3	Rita.....	9,822.73	3.9922321
Muskeg (Geodetic Survey of Canada).....	49 00 51.877 95 23 06.647	96 58 42.3	276 56 13.2	Middleboro.....	4,043.12	3.6067169
Warroad north base=Boundary Monument 909.	48 59 56.463 95 22 30.377	156 42 25.1	336 41 57.7	Muskeg.....	1,863.79	3.2703966
Warroad south base.....	48 55 19.862 95 19 33.829	157 13 15.71	337 11 02.55	Warroad north base.....	9,268.657	3.9670168
Thunder.....	49 00 29.631 95 14 46.326	31 27 35.65 83 50 54.94	211 23 58.78 263 45 04.70	Warroad south base..... Warroad north base.....	11,214.62 9,487.18	4.0497845 3.9771370
West Willow.....	48 53 44.637 95 09 35.166	103 37 43.55 126 06 34.18 153 11 31.40	283 30 12.36 305 58 49.59 333 07 36.74	Warroad south base..... Warroad north base..... Thunder.....	12,540.58 19,512.59 14,021.39	4.0983175 4.2903148 4.1467910
Stoney.....	49 09 03.604 95 07 56.980	4 01 47.04 27 39 41.26 46 27 16.55	184 00 32.91 207 34 31.95 226 16 16.64	West Willow..... Thunder..... Warroad north base.....	28,458.46 17,919.50 24,492.88	4.4542114 4.2533258 4.3890398

## GEOGRAPHIC POSITIONS OF TRIANGULATION STATIONS, LAND SURVEY CORNERS, AND FOREST SERVICE LOOKOUTS, GEORGIA STRAIT TO LAKE OF THE WOODS, SUPPLEMENTARY TO FIRST-ORDER SCHEME

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Lake View.....	49 02 34.302 120 09 29.001	11 37 11.8 66 03 15.4 289 11 28.9	191 55 29.7 245 52 52.4 109 28 26.2	Rommel (U. S. C. & G. S.)... Sheep..... Chopaka (U. S. C. & G. S.)...	13, 673. 6 18, 364. 2 29, 036. 1	4. 135882 4. 263972 4. 462939
Snowy.....	49 02 57.034 119 52 03.900	59 54 55.2 88 32 52.1 328 50 02.2	239 40 04.5 268 19 42.8 148 53 50.8	Rommel (U. S. C. & G. S.)... Lake View..... Chopaka (U. S. C. & G. S.)...	27, 770. 5 21, 230. 9 11, 906. 2	4. 443584 4. 326969 4. 075773
Goat Peak Lookout.....	48 37 56.297 120 24 10.004	129 55 37.4 231 16 54.5 262 50 47.9	309 47 55.1 51 44 51.5 83 21 02.0	Robinson..... Chopaka (U. S. C. & G. S.)... Tiffany (U. S. C. & G. S.)...	16, 404. 3 58, 117. 2 34, 987. 3	4. 214958 4. 764305 4. 543910
Tower Mountain.....	48 35 19.41 120 42 10.03	211 42 08 260 42 47	31 47 56 81 17 31	Robinson..... Tiffany (U. S. C. & G. S.)...	18, 063. 9 57, 577. 8	4. 256812 4. 760255
North Twenty Mile Lookout.....	48 45 06.128 120 04 01.507	153 45 54.6 222 09 30.2 312 19 55.2	333 40 06.2 42 22 18.6 132 26 02.4	Rommel (U. S. C. & G. S.)... Chopaka (U. S. C. & G. S.)... Tiffany (U. S. C. & G. S.)...	21, 312. 0 30, 930. 9 13, 527. 6	4. 328624 4. 490393 4. 131222
Muckamuck Lookout.....	48 36 40.080 119 51 19.753	139 23 51.3 187 46 49.3 229 30 44.4	319 20 26.4 7 50 03.9 49 41 17.9	Tiffany (U. S. C. & G. S.)... Chopaka (U. S. C. & G. S.)... Lemanasky (U. S. C. & G. S.)...	8, 581. 9 38, 882. 4 22, 661. 0	3. 933583 4. 589753 4. 355279
Bonaparte (U. S. G. S.).....	48 47 07.777 119 07 15.714	127 46 34.8 213 26 37.1 257 29 13.1	307 36 49.6 33 28 31.6 77 42 17.0	Oroville..... Spur..... Bodie.....	20, 027. 3 5, 632. 9 21, 765. 2	4. 301622 3. 750734 4. 337762
Mon. 118.....	49 00 00.737 119 25 39.210	9 54 58.3 135 16 17.0 199 24 33.1	189 54 22.7 315 14 22.7 19 26 02.1	Osoyoos south base..... Osoyoos north base..... Anarchist.....	5, 577. 2 4, 372. 9 7, 196. 8	3. 746420 4. 640799 3. 857138
Mon. 117.....	49 00 00.744 119 27 32.066	269 59 35.9 346 20 06.1	90 01 01.0 166 20 55.6	Mon. 118..... Osoyoos south base.....	2, 293. 9 5, 654. 1	3. 360579 3. 752363
White.....	48 50 06.026 118 41 00.789	31 51 15.1 160 50 38.2 327 13 38.9	211 44 33.4 340 57 33.0 147 23 10.9	Bodie..... Greenwood..... Leona.....	20, 604. 7 10, 335. 5 28, 644. 0	4. 313966 4. 014330 4. 457033
Paris.....	49 01 28.067 118 37 08.653	47 06 01.6 123 42 35.5 339 17 48.8	227 03 06.4 303 37 34.9 159 24 26.0	White..... Greenwood..... Leona.....	6, 443. 0 9, 710. 1 30, 449. 9	3. 809091 3. 987225 4. 483586
Copper Butte (U. S. F. S.).....	48 42 09.314 118 27 52.291	117 22 40.4 175 19 51.5 254 19 04.7	297 06 06.6 355 19 29.6 74 45 19.2	Bodie..... Leona..... O'Toole.....	30, 356. 8 7, 325. 2 44, 378. 8	4. 482256 3. 864821 4. 647176
Lake (U. S. C. & G. S.).....	49 02 20.035 117 44 43.327	135 39 12.4 244 17 38.5	315 31 41.7 64 32 08.3	Glory..... Kelly.....	17, 289. 4 25, 893. 2	4. 237781 4. 413185
Beaver (U. S. C. & G. S.).....	49 06 50.600 117 25 12.351	70 44 45.0 96 32 39.5 171 51 09.5	250 30 00.2 276 10 23.0 351 50 54.4	Lake..... Glory..... Kelly.....	25, 191. 9 36, 049. 8 2, 852. 6	4. 401261 4. 556903 3. 455238
Creston.....	49 05 42.414 116 30 52.069	12 09 44.3 111 53 06.9	192 06 28.0 291 38 49.6	Parker..... Summit.....	25, 162. 7 24, 742. 3	4. 400757 4. 393440
Boundary Monument No. 12, Montana-Idaho state line.	48 52 33.476 116 02 52.991	89 52 15.4 120 42 41.4 219 52 45.8	269 27 54.6 300 07 17.8 39 55 49.5	Parker..... Summit..... Ewing.....	39, 516. 3 66, 259. 0 7, 738. 7	4. 596776 4. 821245 3. 888666
Gateway south base.....	48 58 54.450 115 10 09.362	84 48 22.6 173 19 55.6 277 27 42.8 332 22 25.5	264 37 26.9 353 19 12.0 97 38 24.3 152 23 10.1	Yaak..... Frost..... Green..... Campbell.....	17, 777. 5 10, 095. 5 17, 444. 8 2, 595. 1	4. 249870 4. 004126 4. 241665 3. 414147
Rainbow Peak.....	48 52 43.65 114 05 46.82	224 09 20 268 09 06	44 10 14 88 23 41	Carter..... Crossley.....	2, 058. 0 23, 674. 2	3. 313444 4. 374275
Mt. Merritt.....	48 52 19.34 113 47 08.08	96 03 46 210 42 53	275 50 36 30 43 26	Carter..... Crossley.....	21, 475. 2 1, 703. 4	4. 331938 3. 231322
Galbreath.....	48 55 48.360 113 15 32.244	26 55 04.4 140 45 44.2 275 23 03.1	206 50 31.4 320 36 27.9 95 33 06.6	Divide..... Beazer..... Mussetter.....	16, 339. 2 23, 637. 7 16, 371. 5	4. 213232 4. 373606 4. 214088
Stack.....	48 58 04.533 113 08 10.962	64 56 35.1 120 35 34.2 308 13 39.3	244 51 02.4 300 20 44.5 128 18 10.2	Galbreath..... Beazer..... Mussetter.....	9, 915. 2 27, 769. 7 9, 311. 4	3. 996303 4. 443571 3. 969015
G. L. O. No. 53 ecc.....	48 50 53.821 113 14 06.760	59 06 54.7 169 10 26.3	239 01 17.5 349 09 21.9	Divide..... Galbreath.....	10, 652. 0 9, 263. 8	4. 027430 3. 966788
G. L. O. No. 53.....	48 50 55.55 113 14 06.75	0 16 04	180 16 04	G. L. O. No. 53 ecc.....	53. 52	1. 72856
G. L. O. No. 52.....	48 54 52.05 113 02 15.67	204 12 37	24 12 40	Mussetter.....	190. 9	2. 29419
G. L. O. No. 51.....	48 59 54.731 112 51 03.723	45 22 03.1 269 53 29.9	225 20 47.2 89 57 51.7	Ridge..... Boundary east base.....	2, 873. 8 7, 051. 3	3. 458456 3. 848272



## GEORGIA STRAIT TO LAKE OF THE WOODS, SUPPLEMENTARY TO FIRST-ORDER—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
G. L. O. No. 50.....	48 54 51.727 112 43 09.632	122 10 50.2 164 34 27.0	302 03 36.8 344 32 51.1	Ridge..... Boundary east base.....	13,806.3 9,719.8	4.140078 3.987659
Bench.....	49 00 11.858 112 45 05.914	23 05 12.9 74 45 10.2 87 53 01.3	203 05 04.7 254 39 24.3 267 44 21.9	Boundary east base..... Ridge..... Boundary west base.....	565.5 9,660.9 13,999.0	2.752444 3.985017 4.146096
Track.....	48 59 42.649 112 22 27.764	64 26 38.2 181 55 17.5 228 19 19.6 310 39 34.1	244 14 32.7 1 55 46.9 48 25 23.6 130 50 34.9	Landslide..... Meeks..... Senior..... McCormick.....	21,715.1 23,454.7 13,101.0 23,556.3	4.336761 4.370230 4.117304 4.372107
Headlight Butte (U. S. G. S.).....	48 47 22.256 112 18 35.092	119 03 59.1 189 06 31.6 240 13 34.3	298 48 59.4 9 09 39.7 60 21 39.0	Landslide..... Senior..... McCormick.....	27,833.8 31,979.8 15,123.2	4.444572 4.504876 4.179645
G. L. O. No. 49 ecc.....	48 54 54.191 112 11 41.593	267 35 16.4 323 59 29.9	88 05 16.7 144 02 23.5	West Butte..... McCormick.....	48,652.5 7,991.1	4.687105 3.902804
G. L. O. No. 49.....	48 54 50.63 112 11 32.96	121 59 58	301 59 51	G. L. O. No. 49 ecc.....	207.35	2.31671
G. L. O. No. 48.....	48 51 21.23 112 08 03.86	247 38 34	67 38 44	McCormick.....	280.74	2.44831
Tennant.....	49 01 01.830 111 58 24.606	32 57 28.4 107 52 32.9 166 37 40.5	212 50 21.2 287 40 27.1 346 35 20.8	McCormick..... Senior..... Verdigris.....	21,227.2 20,495.0 16,192.1	4.326892 4.311648 4.209303
Moberly.....	48 58 49.270 111 57 45.173	42 00 27.8 117 05 42.3 168 55 45.1	221 52 51.1 296 53 06.9 348 55 15.4	McCormick..... Senior..... Tennant.....	18,456.8 22,809.2 4,172.7	4.266157 4.358110 3.620415
G. L. O. No. 33.....	48 35 18.06 110 44 57.40	174 11 46	94 12 19	Joplin.....	895.27	2.951954
Sweetgrass.....	48 52 28.013 111 08 19.465	268 43 42.5 317 01 46.5	89 13 05.8 137 19 53.0	Goldstone..... Joplin.....	47,702.4 43,463.8	4.678540 4.638128
Chester.....	48 53 11.013 110 53 54.472	170 49 47.6 227 42 14.9	350 48 27.3 47 47 36.9	Pinhorn..... New.....	13,573.8 11,750.3	4.132700 4.070050
G. L. O. No. 34.....	48 53 07.36 110 54 10.41	250 49 42	70 49 54	Chester.....	343.67	2.536139
Center VI.....	48 59 55.172 110 56 03.309	206 27 08.2 292 00 34.9 348 07 37.3	26 27 25.0 112 07 34.4 168 09 14.5	Pinhorn..... New..... Chester.....	1,021.9 12,201.7 12,757.3	3.009406 4.086421 4.105758
Alma.....	48 48 46.478 110 46 18.991	99 53 30.4 177 57 09.2 249 35 08.9	279 36 52.0 357 56 47.9 69 47 57.1	Hill..... New..... Goldstone.....	27,443.0 16,062.7 22,180.8	4.438432 4.206359 4.345977
Strode.....	48 56 58.799 110 44 44.523	227 39 55.3 291 37 33.1 359 06 16.8	47 55 32.4 111 49 10.9 179 06 20.9	Sage..... Goldstone..... Joplin.....	34,010.3 20,291.4 40,250.6	4.531610 4.307312 4.604772
G. L. O. No. 35.....	48 57 01.63 110 44 28.19	75 15 21	255 15 09	Strode.....	343.58	2.53003
G. L. O. No. 36.....	48 54 50.905 110 36 37.461	80 33 00.1 291 40 14.1	260 09 02.7 111 45 44.7	Hill..... Goldstone.....	39,424.5 9,619.6	4.595766 3.983155
G. L. O. No. 37.....	48 53 06.76 110 29 16.88	6 07 00	186 06 59	Goldstone.....	344.07	2.53665
G. L. O. No. 38.....	48 44 25.237 110 21 25.074	148 32 54.3 242 36 59.3	328 26 57.9 62 55 39.5	Goldstone..... Simpson.....	18,493.2 34,154.3	4.267013 4.533446
G. L. O. No. 39 ecc.....	48 54 57.934 110 05 23.386	45 12 11.6 82 47 20.8 290 00 11.2	225 00 07.7 262 29 19.2 110 06 48.2	G. L. O. No. 38..... Goldstone..... Simpson.....	27,689.6 29,475.8 11,422.5	4.442317 4.469466 4.057761
G. L. O. No. 39.....	48 54 27.73 110 03 25.92	111 19 24 289 39 06	291 17 55 109 44 16	G. L. O. No. 39 ecc..... Simpson.....	2,567.4 8,856.0	3.409488 3.947236
G. L. O. No. 40.....	48 52 43.78 109 56 32.06	157 51 32	337 51 28	Simpson.....	244.58	2.388412
Havre.....	48 56 46.357 110 06 02.685	136 44 08.4 202 04 37.2 302 10 12.7	316 30 31.8 22 09 44.4 122 17 19.3	Sage..... Govanlock..... Simpson.....	31,962.6 21,949.6 13,626.1	4.504642 4.341426 4.134372
Thibedeau (U. S. G. S.).....	48 46 24.24 109 35 19.37	283 10 29	103 10 30	Havre south base.....	5.95	0.77452
G. L. O. No. 41.....	48 56 56.60 109 35 51.87	326 39 39	146 39 44	Havre north base.....	248.33	2.39503
G. L. O. No. 42.....	48 54 50.350 109 33 17.461	9 01 29.7 100 59 37.2	188 59 58.1 280 48 33.4	Havre south base..... Signal.....	15,830.8 18,252.6	4.199504 4.261325
Forks (U. S. G. S.).....	48 49 09.958 109 21 26.775	73 18 42.9 194 36 25.8 258 03 19.8	253 08 16.7 14 42 41.1 78 21 31.2	Havre south base..... Old Man..... Cherry.....	17,741.4 39,945.7 30,187.6	4.248989 4.601470 4.479828

## GEORGIA STRAIT TO LAKE OF THE WOODS, SUPPLEMENTARY TO FIRST-ORDER—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
West Cherry (U. S. G. S.)	48 52 35.306 108 57 44.012	197 17 15.6 249 13 56.3 287 45 26.7	17 21 55.9 69 30 39.4 107 45 46.8	Lucky Alkali Cherry	25,357.2 28,947.8 569.5	4.404102 4.461616 2.755530
G. L. O. No. 43 ecc	48 54 48.746 109 09 36.513	171 17 43.3 285 30 52.8	351 15 02.5 106 00 09.8	Old Man Cherry	28,510.1 15,656.1	4.454999 4.194684
G. L. O. No. 43	48 54 50.66 109 09 32.90	51 08 56	231 08 54	G. L. O. No. 43 ecc	94.35	1.97474
G. L. O. No. 44	48 59 57.366 108 45 47.349	45 30 44.3 146 25 58.7	225 22 04.0 326 21 38.0	Cherry Lucky	19,709.8 12,667.7	4.294663 4.102698
Tubs	48 55 43.932 108 48 59.405	59 26 28.3 170 24 12.2 254 59 33.7	239 20 13.0 350 22 16.6 75 09 41.6	Cherry Lucky Alkali	11,784.2 18,641.5 16,976.0	4.071301 4.270481 4.229836
S-313	48 59 32.081 108 57 56.321	214 28 35.1 302 46 38.0 356 31 16.2	34 33 24.9 122 53 22.9 176 31 45.5	Lucky Tubs Cherry	13,753.0 12,998.5 13,072.5	4.138397 4.113895 4.116357
Rounds	49 03 18.585 108 48 53.821	27 07 07.7 143 23 29.6 300 39 02.3	207 00 47.8 323 21 29.7 120 49 06.6	Cherry Lucky Alkali	22,510.8 5,401.3 18,927.8	4.352392 3.732495 4.277101
G. L. O. No. 1	48 53 13.63 108 57 23.97	355 12 55.6	175 12 59.8	Cherry	1,362.2	3.1342409
D. L. S. No. 1	49 19 11.37 108 53 51.33	295 10 52.8	115 11 11.8	Claydon	558.3	2.7468676
D. L. S. No. 2	49 05 12.37 108 51 17.34	159 19 31.1	339 19 19.5	Lucky	876.1	2.9425537
Divide	49 10 22.276 109 15 07.519	238 23 42.6 286 49 23.6 326 37 00.2	58 40 08.3 107 07 13.7 146 50 28.1	Claydon Lucky Cherry	30,856.26 29,989.26 39,630.24	4.4893433 4.4769657 4.5980267
D. L. S. No. 3	49 10 27.21 109 15 20.54	300 01 22.5	120 01 32.4	Divide	304.71	2.4838867
Wylie	49 09 54.14 109 09 21.23	228 35 12.5 289 53 10.5	48 47 15.8 110 06 38.6	Claydon Lucky	25,715.93 23,055.12	4.4102022 4.3627673
D. L. S. No. 4	49 10 27.37 109 08 39.63	39 22 53.2	219 22 21.7	Wylie	1,328.10	3.1232308
G. L. O. No. 2	48 58 18.43 108 35 14.76	43 07 33.1	223 07 19.2	Alkali	549.3	2.7398096
D. L. S. No. 5	49 13 04.75 108 35 01.35	209 50 01.0	29 50 01.7	Rapdan	35.28	1.5475286
D. L. S. No. 6	49 05 39.48 108 28 34.96	210 45 43.0	30 45 47.0	Center	210.43	2.3231077
D. L. S. No. 7	49 12 12.24 108 21 34.24	279 27 04.3	99 27 24.1	Climax	536.15	2.7292863
G. L. O. No. 3	48 57 25.72 108 20 04.98	258 48 38.3	78 49 00.8	Big Butte	619.0	2.7916907
D. L. S. No. 8	49 10 27.53 108 07 14.09	356 02 14.1	176 02 14.8	Edmund	296.51	2.4571398
G. L. O. No. 4	48 55 40.28 108 02 15.53	159 22 22.0	339 22 18.0	Porter	307.29	2.4875484
D. L. S. No. 9	49 00 25.42 107 48 32.63	194 17 29.9	14 17 35.0	Monchy	558.35	2.7469065
Center XV	49 00 00.742 107 47 06.328	128 53 53.9 163 06 43.0 204 06 28.2	308 52 53.9 343 02 48.3 24 12 32.6	Monchy Roche 70 Mile Butte	2,076.2 21,653.0 23,896.7	3.317275 4.335517 4.378338
G. L. O. No. 5	48 59 33.41 107 34 32.47	236 04 20.0	56 04 37.2	Whitewater	558.5	2.7470232
T. S. B. M. No. 31 <sup>1</sup>	49 00 02.43 107 36 30.85	94 59 46.2 281 30 28.6	274 50 46.6 101 32 15.2	Monchy Whitewater	14,545.0 2,928.6	4.1639078 3.4666669
G. L. O. No. 6	48 57 22.06 107 16 41.13	109 08 13.7	289 08 06.5	Long	207.0	2.3159703
D. L. S. No. 10	49 17 27.72 107 15 00.88	299 39 16.1	119 39 21.5	Wideview	165.2	2.2180100
D. L. S. No. 11	49 08 17.34 107 09 49.58	136 59 27.8	316 59 23.0	Blum	186.2	2.2699797
D. L. S. No. 12	49 10 28.40 106 50 07.99	210 00 07.1	30 00 16.7	Peaked Butte	512.89	2.7100242
G. L. O. No. 7	48 52 48.17 106 49 59.41	248 59 37.8	69 00 21.8	Thoeny	1,274.60	3.1053739

<sup>1</sup> No check on this position.

## GEORGIA STRAIT TO LAKE OF THE WOODS, SUPPLEMENTARY TO FIRST-ORDER—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
D. L. S. No. 13.....	49 10 28.07 106 36 26.39	114 07 18.4	294 07 10.0	Clay Butte.....	246.71	2.3921868
G. L. O. No. 8.....	48 54 44.27 100 31 09.49	122 01 55.0	302 01 25.4	Roanwood.....	944.68	2.9752847
G. L. O. No. 9.....	48 52 54.46 106 18 13.17	144 36 49.7	324 36 31.0	Glentana.....	871.74	2.9403870
D. L. S. No. 14.....	49 06 59.32 106 16 25.29	140 16 36.7	320 16 28.9	Table Butte.....	328.47	2.5164957
D. L. S. No. 15.....	49 10 54.44 106 03 00.62	67 40 52.6	247 40 42.2	Quantock.....	301.84	2.4797768
G. L. O. No. 10.....	48 54 38.74 106 01 14.09	161 14 08.1	341 13 57.6	Richland.....	874.93	2.9419733
G. L. O. No. 11.....	48 50 17.97 105 52 45.03	129 10 46.4	309 10 27.5	Templeman.....	657.07	2.8176116
D. L. S. No. 16.....	49 08 43.11 105 47 22.72	103 04 10.2	283 03 56.8	Fife Lake.....	368.32	2.5662253
D. L. S. No. 17.....	49 01 17.63 105 35 21.87	246 43 01.7	66 43 10.6	Poplar (G. S. of C.).....	260.87	2.4164241
D. L. S. No. 18.....	49 06 57.34 105 21 20.10	356 42 22.6	176 42 22.9	Eddyside.....	138.03	2.1399735
G. L. O. No. 12.....	48 57 14.94 105 13 19.47	344 29 43.0	164 29 46.6	Whitetail.....	354.84	2.5500326
G. L. O. No. 13.....	48 45 57.48 105 06 51.25	161 35 26.7	341 35 25.3	Flaxville.....	120.56	2.0812032
Madoc school.....	48 48 35.72 105 17 13.52	83 57 51.1 197 11 25.1 290 35 22.9	263 56 27.0 17 14 25.0 110 43 10.0	Madoc..... Whitetail..... Flaxville.....	2,292.40 16,433.54 13,533.85	3.3602899 4.2157312 4.1314215
D. L. S. No. 19.....	49 02 08.65 105 01 58.66	64 45 21.3	244 44 59.7	Mervin (G. S. of C.).....	642.26	2.8077109
Flaxville church.....	48 48 18.61 105 10 31.92	168 27 23.9 201 12 16.3 313 31 18.3	348 25 21.2 21 18 21.6 133 34 02.9	Whitetail..... Mervin (G. S. of C.)..... Flaxville.....	16,561.86 27,218.34 6,162.22	4.2191091 4.4346616 3.7897370
Fire.....	48 58 56.830 105 04 56.906	5 39 21.9 71 02 25.6 208 16 15.0	185 37 54.4 250 56 10.0 28 18 08.0	Flaxville..... Whitetail..... Mervin (G. S. of C.).....	24,077.3 10,711.5 6,417.9	4.381607 4.029851 3.807393
G. L. O. No. 14.....	48 59 57.13 104 45 16.67	57 19 46.3	237 19 33.4	Ross.....	410.39	2.6131968
G. L. O. No. 15.....	48 43 20.44 104 44 36.27	303 35 09.6	123 35 31.2	Plentywood.....	704.68	2.8479920
G. L. O. No. 16.....	48 56 22.48 104 33 06.87	212 13 22.7	32 13 36.7	Bruce.....	707.97	2.8500149
Dooley school <sup>1</sup> .....	48 52 40.48 104 23 21.52	122 55 30.8 347 08 23.6	302 48 23.6 167 08 38.8	Bruce..... Dooley.....	13,740.52 1,849.57	4.1380031 3.2670712
D. L. S. No. 20.....	49 04 20.68 104 20 35.05	55 39 18.4	235 39 15.4	Tangedal.....	96.95	1.9865478
D. L. S. No. 21.....	49 04 23.28 104 01 54.93	75 26 39.2	255 26 26.7	Trees.....	345.03	2.5378569
D. L. S. No. 22.....	49 01 43.18 103 50 33.82	22 26 38.3	202 26 31.9	Agate.....	451.78	2.6549270
Oslo church.....	48 58 00.59 103 58 06.78	113 11 07.5 157 04 22.4 234 26 06.2	292 54 06.7 337 01 17.8 54 31 41.6	Tangedal..... Trees..... Agate.....	29,857.10 12,744.37 11,100.61	4.4750476 4.1053183 4.0453469
Pleasant Valley church <sup>1</sup> .....	48 58 07.28 104 08 04.86	211 53 02.5 253 28 40.4	31 57 29.4 73 41 47.2	Trees..... Agate.....	13,582.78 22,092.74	4.1329887 4.3442495
Cut.....	48 59 26.205 104 13 12.540	134 57 42.7 235 50 17.1 298 34 59.1	314 52 05.6 55 58 36.3 118 49 41.4	Tangedal..... Trees..... Alkabo.....	12,806.6 16,217.5 27,465.6	4.107433 4.209985 4.438789
High.....	49 00 36.380 104 15 41.488	138 43 02.5 306 35 19.0	318 39 17.8 125 37 11.4	Tangedal..... Cut.....	9,152.3 3,723.6	3.961532 3.570964
Norge school <sup>1</sup> .....	49 01 45.02 104 02 55.33	190 31 18.8 271 47 04.1	10 31 52.0 91 56 17.6	Trees..... Agate.....	4,884.56 14,899.33	3.6888251 4.1731666
Summit school <sup>1</sup> .....	49 05 13.32 103 57 05.74	75 17 15.2 311 35 18.0	255 13 24.3 131 40 07.6	Trees..... Agate.....	6,413.92 10,415.04	3.8071232 4.0176809
G. L. O. No. 17.....	48 53 41.39 103 47 36.96	287 29 13.1	107 29 25.0	Norge.....	337.00	2.5276299

<sup>1</sup> No check on this position.

## GEORGIA STRAIT TO LAKE OF THE WOODS, SUPPLEMENTARY TO FIRST-ORDER—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Church No. 1 <sup>1</sup> .....	48 47 33.46 104 00 43.79	205 18 49.6 235 22 33.2	25 26 22.9 55 32 37.5	Agate..... Norge.....	28,579.28 19,867.20	4.4560512 4.2981366
Alkabo school <sup>1</sup> .....	48 51 57.90 103 53 11.22	151 10 13.3 246 30 04.2	331 09 59.9 66 34 27.9	Alkabo..... Norge.....	750.20 7,774.99	2.8751792 3.8906999
G. L. O. No. 18.....	48 58 01.92 103 46 17.24	352 31 16.5	172 31 17.8	Pole.....	268.90	2.4295908
Fortuna school.....	48 54 28.89 103 46 22.77	37 10 51.6 65 16 14.8 181 20 19.5	217 10 07.6 245 10 53.7 1 20 24.9	Norge..... Alkabo..... Pole.....	1,968.57 9,562.16 6,315.91	3.2941499 3.9805561 3.8004361
D. L. S. No. 23.....	49 01 41.84 103 39 50.62	185 38 34.8	5 38 36.2	Messers.....	382.51	2.5826428
Colgan school.....	48 57 02.65 103 37 11.22	63 05 43.2 98 05 54.1 160 26 13.6	242 58 03.4 277 59 03.6 340 24 14.7	Norge..... Pole..... Messers.....	13,932.46 11,182.81 9,558.00	4.1440277 4.0485514 3.9803671
Twin Butte church.....	48 50 50.10 103 35 44.01	97 20 09.3 110 08 26.4 218 45 15.0	277 06 47.3 269 59 41.3 38 48 53.1	Alkabo..... Norge..... Ambrose.....	21,881.05 15,125.64 9,416.05	4.3400682 4.1797137 3.9739689
D. L. S. No. 24.....	49 03 26.95 103 29 10.91	33 28 46.3	213 28 44.8	Schnell.....	69.55	1.8422971
Bromhead church.....	49 10 48.32 103 40 36.60	314 34 05.8 338 13 14.4 356 37 49.9	134 42 42.8 158 20 34.0 176 36 26.1	Schnell..... Ambrose..... Messers.....	19,487.30 31,942.54 16,528.69	4.2897516 4.5043994 4.2182647
Lake Qu'Appelle church.....	49 14 53.49 103 33 09.09	18 38 23.6 347 17 13.4 355 47 35.7	198 33 21.3 167 20 12.1 175 49 17.4	Messers..... Schnell..... Ambrose.....	25,401.73 21,798.22 37,349.13	4.4048633 4.3384410 4.5722805
Church No. 2.....	49 03 28.57 103 32 26.85	72 02 35.2 271 33 09.0 353 20 12.2	251 57 01.4 91 35 35.5 173 21 21.8	Messers..... Schnell..... Ambrose.....	9,436.54 3,941.14 16,199.59	3.9748129 3.5956214 4.2095039
G. L. O. No. 19.....	48 56 16.44 103 25 15.44	99 08 55.8	279 08 54.9	Hansen.....	24.70	1.3927970
Church No. 3.....	48 52 46.33 103 28 26.75	140 43 25.0 141 15 27.7 210 46 51.1	320 34 50.6 321 13 36.3 30 49 14.4	Messers..... Ambrose..... Hansen.....	21,884.05 4,808.01 7,560.63	4.3401278 3.6819650 3.8785577
Ambrose school.....	48 57 11.99 103 28 36.00	32 19 53.2 122 34 52.1 292 51 45.9	212 18 08.8 302 26 24.4 112 54 16.3	Ambrose..... Messers..... Hansen.....	5,274.15 16,218.46 4,403.27	3.7221524 4.2100065 3.6437756
D. L. S. No. 25.....	49 06 56.96 103 15 09.83	333 02 51.5	153 03 01.6	Gardner.....	597.53	2.7763571
Torquay elevator.....	49 08 32.76 103 29 14.95	46 18 41.9 281 15 38.4 359 44 13.9	226 10 43.0 101 26 28.0 179 44 15.6	Messers..... Gardner..... Schnell.....	17,805.01 17,752.35 9,505.24	4.2505423 4.2492559 3.9779631
Crosby courthouse.....	48 54 55.63 103 17 38.29	105 02 58.0 188 34 49.0 248 24 22.8	284 57 12.4 8 36 51.1 68 26 40.8	Hansen..... Gardner..... Peterson.....	9,659.28 21,995.93 3,921.18	3.9849448 4.3423424 3.5934167
D. L. S. No. 26.....	49 07 01.64 102 54 45.67	151 52 31.5	331 52 21.3	Estevan.....	584.73	2.7669554
G. L. O. No. 20.....	48 49 45.05 102 53 44.43	108 56 21.5	288 56 01.6	Cook.....	571.52	2.7570314
Estevan water tank.....	49 08 21.80 102 59 35.33	80 30 25.0 289 16 44.9 349 05 06.9	260 18 48.5 109 20 13.7 169 09 11.7	Gardner..... Estevan..... Cook.....	18,941.08 5,930.18 34,940.78	4.2774047 3.7730678 4.5433326
G. L. O. No. 21.....	48 58 26.57 102 45 50.59	255 07 29.7	75 07 46.4	Short Creek.....	465.89	2.6682834
Larson church <sup>1</sup> .....	48 53 26.97 102 51 28.15	26 27 58.2 217 57 04.2	206 25 55.6 38 01 35.4	Cook..... Short Creek.....	7,449.38 11,894.71	3.8721201 4.0753537
D. L. S. No. 27.....	49 02 09.83 102 40 40.32	235 08 23.6	55 08 48.2	Dunbar.....	804.38	2.9054613
Estevan school.....	49 08 08.78 102 59 10.79	81 55 41.6 286 58 10.1 254 30 11.3	261 43 46.6 107 01 20.3 114 44 35.1	Gardner..... Estevan..... Dunbar.....	19,371.38 5,332.11 25,510.92	4.2871605 3.7268994 4.4067261
Bienfait school.....	49 08 33.06 102 48 13.38	11 52 58.7 74 22 12.8 319 03 51.0	191 48 28.9 254 17 05.8 139 09 58.0	Cook..... Estevan..... Dunbar.....	35,414.55 8,545.92 15,051.14	4.5491817 3.9317586 4.1775694
Columbus church.....	48 54 22.40 102 46 50.03	47 02 13.3 192 12 59.3 208 43 27.7	226 56 41.2 12 14 00.8 28 48 31.1	Cook..... Short Creek..... Dunbar.....	12,288.12 7,840.15 16,997.04	4.0804855 3.8943245 4.2303733

<sup>1</sup> No check on this position.

## GEORGIA STRAIT TO LAKE OF THE WOODS, SUPPLEMENTARY TO FIRST-ORDER—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Briquet plant, water tank .....	49 06 04.31 102 44 15.11	22 00 59.6 99 59 46.4 323 28 32.6	201 53 30.2 279 51 39.5 143 31 39.4	Cook..... Estevan..... Dunbar.....	32,415.74 13,262.55 8,438.83	4.5107559 4.1226269 3.9262824
D. L. S. No. 28.....	48 59 57.18 102 33 16.10	275 01 30.6	95 01 43.1	Portal.....	339.27	2.5305455
G. L. O. No. 22.....	48 52 20.94 102 32 44.40	163 29 30.6	343 29 25.3	Lignite.....	506.25	2.7043650
Lignite church.....	48 52 34.36 102 33 40.27	156 39 39.7 183 28 34.6 266 05 19.0	336 34 47.4 3 29 05.4 86 05 55.8	Dunbar..... Portal..... Lignite.....	19,868.07 13,674.71 996.78	4.2981557 4.1359182 2.9985984
Portal chimney.....	48 59 48.04 102 32 47.05	0 23 12.6 54 56 00.7 118 25 58.1	180 23 09.3 234 39 53.0 298 20 25.4	Lignite..... Cook..... Dunbar.....	13,329.48 31,991.77 10,179.99	4.1248131 4.5050383 4.0077473
G. L. O. No. 23.....	48 54 05.14 102 19 37.22	227 25 48.2	47 25 51.2	Flaxton.....	108.75	2.0364293
Flaxton school <sup>1</sup> .....	48 53 47.31 102 23 16.92	79 28 57.7 262 10 14.1	259 21 44.8 82 13 02.6	Lignite..... Flaxton.....	11,907.12 4,597.19	4.0758067 3.6624923
D. L. S. No. 29.....	49 01 16.00 102 16 29.49	104 56 33.3	284 55 48.4	Spy.....	1,250.26	3.0970003
Frobisher elevator.....	49 12 24.88 102 25 31.82	21 28 57.9 43 51 47.1 334 14 33.8	201 23 19.5 223 40 44.7 154 20 38.9	Portal..... Dunbar..... Spy.....	24,846.39 25,675.26 22,575.14	4.3952633 4.4065149 4.3536305
Church No. 4.....	48 55 21.36 102 20 54.72	120 00 49.1 200 20 14.2 323 58 38.1	299 51 42.5 20 22 49.4 143 59 39.4	Portal..... Spy..... Flaxton.....	17,013.08 12,028.84 2,819.91	4.2307829 4.0802238 3.4502350
Alameda school <sup>1</sup> .....	49 15 51.29 102 17 03.59	1 06 16.4 33 23 48.4	181 05 57.2 213 11 45.5	Spy..... Portal.....	26,722.61 35,299.13	4.4268788 4.5477640
D. L. S. No. 30.....	49 02 35.32 102 05 03.51	330 14 51.4	150 15 01.9	Martin.....	568.65	2.7548450
Perella elevator.....	48 54 08.42 102 15 01.55	89 44 39.4 167 31 17.9 219 18 39.2	269 41 14.7 347 29 26.7 39 26 20.8	Flaxton..... Spy..... Martin.....	5,534.28 13,859.12 19,618.32	3.7430612 4.1417355 4.2926618
Church No. 5.....	48 51 02.99 102 10 23.49	117 01 32.1 155 50 07.9 197 58 41.4	296 54 38.0 335 44 47.1 18 02 53.2	Flaxton..... Spy..... Martin.....	12,569.93 21,115.76 21,969.85	4.0993327 4.3246068 4.3418270
Oxbow Church <sup>1</sup> .....	49 13 48.75 102 10 21.20	20 45 37.6 342 26 57.0	200 40 14.2 162 31 07.7	Spy..... Martin.....	24,517.07 22,333.28	4.3894686 4.3489525
G. L. O. No. 24.....	48 54 30.11 102 01 55.16	101 38 16.2	281 38 05.8	McGillivray.....	286.40	2.4569730
Elcott elevator.....	49 02 44.07 102 17 50.49	7 28 29.7 74 24 42.0 308 20 53.8	187 27 12.2 254 13 15.8 128 32 44.2	Flaxton..... Portal..... McGillivray.....	16,093.25 19,182.04 24,447.65	4.2066437 4.2828948 4.3882371
Bowbells water tank.....	48 48 15.08 102 14 33.10	109 56 47.6 150 41 30.1 232 24 53.8	289 43 00.6 330 37 44.1 52 34 14.2	Lignite..... Flaxton..... McGillivray.....	23,808.69 12,489.46 19,122.53	4.3767356 4.0965436 4.2815453
G. L. O. No. 25.....	48 55 47.52 101 52 05.75	321 04 38.0	141 04 57.8	Bluel.....	851.80	2.9303376
Church No. 6 <sup>1</sup> .....	48 50 10.62 101 54 04.40	129 19 24.2 196 50 40.2	309 13 19.2 16 52 29.4	McGillivray..... Bluel.....	12,754.49 10,182.09	4.1056631 4.0078369
Tolley elevator <sup>1</sup> .....	48 43 40.50 101 49 46.71	143 07 14.1 173 59 17.7	322 57 55.5 353 57 52.8	McGillivray..... Bluel.....	25,184.56 21,916.37	4.4011344 4.3407687
D. L. S. No. 31.....	49 03 56.42 101 49 55.55	54 51 49.8	234 51 46.6	Goertz.....	105.08	2.0215201
G. L. O. No. 26.....	48 53 11.18 101 38 57.96	274 15 01.9	94 15 16.4	Trout.....	391.48	2.5927096
Morse west base school.....	48 57 59.17 101 49 32.38	28 40 52.1 177 05 55.8 235 15 15.1	208 39 16.3 357 05 35.1 55 24 07.7	Bluel..... Goertz..... Harris.....	5,390.40 10,989.54 17,434.93	3.7316209 4.0409795 4.2414201
Sherwood church.....	48 57 43.70 101 37 42.04	76 04 42.1 127 27 25.4 179 28 10.1	255 54 10.6 307 18 08.5 359 28 06.6	Bluel..... Goertz..... Harris.....	17,563.34 18,865.75 10,396.64	4.2446072 4.2756740 4.0168929
Carievale elevator <sup>1</sup> .....	49 10 38.09 101 37 37.90	0 45 49.6 50 25 22.1	180 45 42.9 230 16 01.2	Harris..... Goertz.....	13,527.29 19,538.78	4.1312108 4.2908975
D. L. S. No. 32.....	49 02 38.59 101 24 24.27	128 26 29.4	308 26 24.4	Gainsborough.....	173.70	2.2397998

<sup>1</sup>No check on this position.

## GEORGIA STRAIT TO LAKE OF THE WOODS, SUPPLEMENTARY TO FIRST-ORDER—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
G. L. O. No. 27.....	48 53 36.54 101 24 32.48	307 51 25.9	127 51 32.2	Mohall.....	214.80	2.3320383
Mohall water tank.....	48 45 51.63 101 30 37.16	144 06 18.5 193 23 55.0 208 05 29.6	324 00 16.0 13 28 31.0 28 10 10.4	Trout..... Gainsborough..... Mohall.....	16,735.83 32,092.42 10,135.67	4.2236473 4.5064025 4.2077869
D. L. S. No. 33.....	49 03 58.05 101 09 37.41	66 25 26.9	246 24 43.7	Lyleton.....	1,268.15	3.1031706
Lyleton school <sup>1</sup> .....	49 03 27.52 101 10 47.32	85 17 19.8 210 31 00.1	265 06 57.6 30 31 09.7	Gainsborough..... Lyleton.....	16,783.22 505.99	4.2248754 2.7041400
G. L. O. No. 28.....	48 54 02.51 101 07 27.80	177 38 52.6	357 38 51.8	Westhope.....	522.06	2.7177204
Antler church.....	48 58 18.99 101 16 49.42	46 18 31.5 130 57 21.4 302 54 59.3	226 12 48.6 310 51 33.0 123 02 01.9	Mohall..... Gainsborough..... Westhope.....	12,810.70 12,411.14 13,598.82	4.1075727 4.0938115 4.1335013
Kuroki elevator <sup>1</sup> .....	48 55 55.23 101 08 39.30	77 10 15.8 334 08 35.8	256 58 23.6 154 09 28.9	Mohall..... Westhope.....	19,739.31 3,289.88	4.2953320 3.5171804
Church No. 7 <sup>1</sup> .....	48 52 19.24 101 17 59.71	106 06 30.4 253 49 30.8	286 01 40.8 73 57 26.1	Mohall..... Westhope.....	8,151.15 13,376.78	3.9112187 4.1263517
D. L. S. No. 34.....	49 03 57.93 100 58 52.01	271 11 29.2	91 12 06.2	Hayden.....	993.78	2.9972881
Cameron elevator.....	49 04 51.43 101 04 35.97	10 13 19.5 73 32 24.7 281 48 32.4	190 11 09.0 253 27 53.7 101 53 29.3	Westhope..... Lyleton..... Hayden.....	19,838.36 7,592.90 8,148.24	4.2975057 3.8804077 3.9110328
G. L. O. No. 29.....	48 56 14.31 100 54 22.87	355 45 19.9	175 45 20.9	Malme.....	384.07	2.5844104
Coulter water tank.....	49 05 03.61 101 00 27.42	78 27 10.6 304 57 29.4 336 00 00.1	258 19 31.8 124 59 18.5 156 04 36.3	Lyleton..... Hayden..... Malme.....	12,582.27 3,575.46 18,312.14	4.0997591 3.5533314 4.2627392
Coulter church.....	49 05 20.42 100 59 01.79	77 49 41.2 335 06 09.6 341 41 55.2	257 40 57.7 155 06 54.0 161 45 26.8	Lyleton..... Hayden..... Malme.....	14,380.35 2,831.94 18,169.50	4.1580413 3.4520836 4.2563430
Landa church.....	48 53 41.94 100 54 43.28	167 57 22.7 185 51 24.6 239 45 08.6	347 54 51.9 5 51 41.0 59 51 51.5	Hayden..... Malme..... Souris.....	19,437.67 4,346.53 12,588.15	4.2886442 3.6381422 4.0998620
Church No. 8 <sup>1</sup> .....	48 56 39.21 100 33 20.68	87 33 38.7 93 17 27.9	267 17 48.0 273 08 03.7	Malme..... Souris.....	25,684.16 15,245.88	4.4096653 4.1831526
Carbury school <sup>1</sup> .....	48 53 30.70 100 32 36.18	100 06 16.0 112 33 53.3	279 49 52.2 292 23 55.8	Malme..... Souris.....	26,985.15 17,462.99	4.4311249 4.2421186
Church No. 9.....	48 57 59.40 100 49 19.98	59 25 10.1 206 33 37.0 290 40 13.7	239 21 22.8 26 37 30.8 110 42 53.0	Malme..... Temple..... Souris.....	7,127.54 14,052.84 4,592.63	3.8529396 4.1477641 3.6620616
Waskada church.....	49 05 50.25 100 47 55.75	23 22 04.2 293 22 42.4 350 55 19.0	203 17 13.0 113 25 32.8 170 56 54.9	Malme..... Temple..... Souris.....	19,792.94 4,983.37 16,372.81	4.2965103 3.6975233 4.2141233
Scandia school.....	48 57 03.56 100 47 47.28	76 41 03.9 197 07 08.9 267 33 50.0	256 36 06.7 17 09 52.7 87 35 19.4	Malme..... Temple..... Souris.....	8,244.65 14,955.42 2,413.05	3.9161721 4.1747987 3.3825663
Souris school.....	48 54 43.66 100 40 54.97	126 31 21.6 107 58 30.9 245 30 11.9	306 27 40.1 347 56 03.5 65 39 11.6	Souris..... Temple..... Johnson.....	7,438.56 19,031.83 15,995.68	3.8714887 4.2794805 4.2040027
Mouse River church <sup>1</sup> .....	48 48 25.00 100 51 44.98	167 17 04.6 236 30 22.8	347 15 06.7 56 47 31.8	Malme..... Johnson.....	14,470.01 33,306.09	4.1604687 4.5225237
Kramer church <sup>1</sup> .....	48 41 29.03 100 42 12.30	199 02 50.9 207 20 56.1	19 12 03.6 27 30 53.0	Declercq..... Johnson.....	45,621.64 35,107.34	4.6591709 4.5453979
Minto church <sup>1</sup> .....	49 24 35.72 100 01 30.34	16 47 01.8 357 26 57.2	196 39 53.2 177 28 07.2	Scott..... Ninga H.....	39,780.56 42,193.74	4.5996709 4.6252480
Fairfax church.....	49 26 08.12 100 07 36.02	5 40 04.1 296 36 59.4 348 18 55.7	185 37 32.4 116 47 49.3 168 24 42.7	Scott..... Margaret..... Ninga H.....	41,152.18 19,319.59 45,951.23	4.6143929 4.2859979 4.6622972
Rhodes water tank.....	49 12 04.60 99 47 37.00	38 29 26.4 62 26 41.1 158 16 42.5	218 20 06.3 242 09 02.9 338 12 22.4	Ninga H..... Scott..... Margaret.....	24,181.49 32,036.72 18,709.46	4.3834830 4.5059480 4.2728613
Minto school <sup>1</sup> .....	49 24 26.07 100 01 28.15	299 16 33.1 357 29 30.8	119 22 43.5 177 30 39.1	Margaret..... Ninga H.....	11,290.55 41,894.06	4.0527150 4.6221524
D. L. S. No. 35.....	49 12 01.51 99 51 20.95	64 27 03.2	244 26 52.7	Ram.....	310.49	2.4920476

<sup>1</sup> No check on this position.

## GEORGIA STRAIT TO LAKE OF THE WOODS, SUPPLEMENTARY TO FIRST-ORDER—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Boissevain church.....	49 13 49.38 100 03 07.99	27 40 36.1 283 48 22.4 350 07 32.6	207 34 41.9 103 57 07.2 170 09 56.4	Scott..... Ram..... Ninga H.....	20,463.59 14,451.36 22,516.92	4.3109818 4.1599088 4.3525090
Ninga church.....	49 13 41.43 99 53 16.35	20 24 00.1 179 41 49.1 327 26 27.7	200 18 56.4 359 41 46.2 147 27 44.6	Ninga H..... Margaret..... Ram.....	23,400.64 14,385.34 3,820.92	4.3692277 4.1579201 3.5821683
D. L. S. No. 36.....	49 01 17.40 99 39 37.95	85 58 56.9	265 58 37.4	Lena.....	523.70	2.7190826
Margaret elevator.....	49 24 22.27 59 51 29.23	0 16 47.4 22 27 53.1 311 57 26.9	180 16 43.2 202 26 28.9 132 06 37.4	Ram..... Margaret..... Fairhall.....	23,018.80 5,856.56 19,718.76	4.3620827 3.7676426 4.2948795
Killarney church.....	49 10 59.86 99 59 53.71	55 22 13.2 97 11 01.9 183 00 12.3	235 07 02.9 277 02 11.3 3 00 35.1	Ninga H..... Ram..... Fairhall.....	29,727.94 14,395.57 11,602.11	4.4731648 4.1555053 4.0645369
D. L. S. No. 37.....	49 07 02.78 99 28 52.04	106 45 57.9	286 45 54.9	Holmfild.....	83.92	1.9238655
D. L. S. No. 38.....	49 09 45.73 99 18 06.86	117 10 43.1	297 10 25.0	Mowbray.....	544.43	2.7359459
Lena elevator.....	49 04 19.88 99 39 47.76	134 39 38.8 174 04 09.9 248 09 09.3	314 30 44.2 354 03 26.5 68 25 14.8	Ram..... Killarney..... Mowbray.....	20,123.90 11,237.11 27,872.28	4.3037121 4.0506547 4.4451725
Enterprise elevator.....	49 05 00.17 99 33 04.76	49 48 38.0 136 01 16.0 243 31 35.0	229 43 21.6 315 55 27.9 63 42 35.9	Lena..... Killarney..... Mowbray.....	11,141.35 13,427.58 19,780.43	4.0466378 4.1279679 4.2962358
Holmfild school.....	49 08 04.07 99 29 09.01	106 50 47.3 255 15 41.9 351 50 13.2	286 42 00.7 75 23 44.7 171 50 23.1	Killarney..... Mowbray..... Holmfild.....	14,731.67 13,369.98 1,857.13	4.1682519 4.1261307 3.2688434
Cartwright church.....	49 05 44.21 99 20 22.71	103 27 51.7 196 23 49.5 355 29 39.7	283 21 23.7 16 25 14.2 175 30 05.8	Holmfild..... Mowbray..... Taylor.....	10,702.68 8,034.04 8,919.08	4.0294927 3.9049341 3.9503202
Hansboro school.....	48 57 09.68 99 23 01.26	183 04 12.6 209 14 49.0 220 04 56.6	13 07 36.9 29 17 14.6 40 16 06.0	Mowbray..... Taylor..... Clearwater.....	24,232.06 8,028.00 27,896.20	4.3843904 3.9046074 4.4455450
Mather church.....	49 05 51.24 99 11 25.45	48 18 37.2 131 01 25.3 216 33 45.6	228 12 17.4 310 56 03.7 36 36 09.6	Taylor..... Mowbray..... Clearwater.....	13,681.08 11,421.07 6,479.41	4.1361203 4.0570968 3.8115357
Clearwater elevator.....	49 07 58.04 99 02 32.09	100 30 58.1 222 52 13.1 328 55 20.6	280 26 38.8 42 58 08.2 149 02 10.6	Clearwater..... Pilot Mound..... Fallison.....	7,068.75 13,956.26 21,390.19	3.8493428 4.1447691 4.3302147
D. L. S. No. 39.....	49 03 32.73 98 43 41.22	259 35 18.5	79 35 29.7	Star Mound (G. S. of C.).....	306.58	2.4865490
Crystal City church.....	49 08 53.30 98 57 11.18	88 16 32.4 199 25 14.4 300 23 41.7	268 08 10.3 19 27 06.7 120 34 05.1	Clearwater..... Pilot Mound..... Star Mound (G. S. of C.).....	13,459.96 9,027.61 19,413.62	4.1290437 3.9555726 4.2881066
Fallison elevator.....	49 02 13.42 98 52 04.42	12 38 55.9 171 16 00.8 256 32 58.6	192 37 51.9 351 14 01.0 76 39 29.9	Fallison..... Pilot Mound..... Star Mound (G. S. of C.).....	7,875.78 21,112.06 10,814.19	3.8962936 4.3245306 4.0339941
Purves elevator.....	49 07 28.00 98 43 56.26	33 49 32.4 130 28 25.1 355 11 23.0	213 42 19.7 310 20 15.9 175 11 45.6	Fallison..... Pilot Mound..... Star Mound (G. S. of C.).....	20,934.25 17,198.83 7,238.16	4.3206575 4.2354989 3.8596284
Sarles school <sup>1</sup> .....	48 56 23.58 99 00 35.94	237 25 51.1 250 10 34.1	57 38 48.1 70 15 56.0	Star Mound (G. S. of C.)..... Fallison.....	24,802.73 9,225.97	4.3944995 3.9650119
Clyde church <sup>1</sup> .....	48 46 11.94 98 53 44.26	180 47 46.4 201 16 20.9	0 47 57.8 21 24 06.7	Fallison..... Star Mound (G. S. of C.).....	22,018.29 34,576.50	4.3427835 4.5387810
St. Leon church <sup>1</sup> .....	49 21 47.65 98 35 26.87	16 05 04.2 56 42 34.8	195 59 01.2 236 27 58.5	Star Mound (G. S. of C.)..... Pilot Mound.....	35,136.59 27,982.51	4.5457596 4.4468866
Calvin school.....	48 51 09.30 98 56 02.62	193 40 02.9 213 40 35.9 243 09 17.4	13 41 58.5 33 50 06.3 63 23 51.6	Fallison..... Star Mound (G. S. of C.)..... Cavers.....	13,205.22 27,688.70 26,449.67	4.1207457 4.4423025 4.4224202
Pilot Mound school.....	49 12 07.81 98 53 51.92	157 38 07.5 255 57 27.6 321 16 57.3	337 37 29.0 76 13 03.4 141 24 50.3	Pilot Mound..... Manitou..... Star Mound (G. S. of C.).....	2,707.86 25,755.75 20,304.35	3.4326257 4.4108742 4.3075991
Manitou Normal School.....	49 14 18.49 98 32 22.29	34 06 50.5 86 54 22.4 153 08 52.8	214 00 28.2 307 37 27.2 333 08 11.9	Star Mound (G. S. of C.)..... Pilot Mound..... Manitou.....	24,018.13 27,164.91 2,416.40	4.3805392 4.4340082 3.3831080
Mariapolis church <sup>1</sup> .....	49 21 34.04 98 59 08.37	289 39 21.9 340 16 32.6	109 58 58.8 160 19 53.9	Manitou..... Pilot Mound.....	33,326.93 15,919.89	4.5227973 4.2019400
Kaleida elevator.....	49 07 47.75 98 28 08.87	46 16 47.0 67 18 02.1 156 24 13.1	226 15 58.6 247 06 28.6 336 20 20.4	Kaleida..... Star Mound (G. S. of C.)..... Manitou.....	1,797.27 20,190.82 15,528.50	3.2546144 4.3051540 4.1911296

<sup>1</sup> No check on this position.

## GEORGIA STRAIT TO LAKE OF THE WOODS, SUPPLEMENTARY TO FIRST-ORDER—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Hannah school	48 58 20.09 98 41 22.62	165 30 00.4 269 44 18.8 283 54 08.6	345 28 27.0 89 57 17.2 103 57 39.9	Star Mound (G. S. of C.) Malda Cavers	10,033.54 20,983.48 5,869.65	4.0014544 4.3218775 3.7686123
Snowflake school	49 02 43.75 98 39 24.17	107 42 45.4 197 28 50.3 293 27 08.4	287 39 42.4 17 33 28.6 113 38 37.8	Star Mound (G. S. of C.) Manitou Malda	5,161.63 24,766.49 20,246.89	3.7127872 4.3938645 4.3063584
Wales church	48 53 36.07 98 36 07.08	154 15 19.2 198 31 02.9 238 43 17.2	334 09 47.8 18 36 15.5 58 52 17.2	Star Mound (G. S. of C.) Kaleida Malda	20,532.15 20,442.91 17,043.13	4.3124344 4.4223093 4.2315493
Mowbray elevator	48 59 57.06 98 28 45.39	65 36 45.1 177 35 43.4 297 44 40.8	245 30 45.1 357 35 22.6 117 48 07.9	Cavers Kaleida Malda	10,657.38 13,309.95 6,308.48	4.0276506 4.1241763 3.7999246
D. L. S. No. 40	49 14 12.51 98 23 07.88	233 07 59.5	53 08 09.5	Darlingford	332.54	2.5218406
Darlingford elevator	49 12 11.02 98 22 36.76	40 36 34.5 115 17 10.3 174 44 50.0	220 31 34.8 295 09 06.0 354 44 36.4	Kaleida Manitou Darlingford	12,341.82 14,301.75 3,969.32	4.0913791 4.1553891 3.5987164
North Outlook	49 02 57.954 98 05 31.902	198 42 49.3 247 21 57.1 319 01 18.3	18 46 10.8 67 37 20.0 139 10 02.7	Morden Plum Coulee Walhalla	16,819.7 26,815.2 21,591.0	4.225819 4.428382 4.334272
South Outlook	49 00 55.788 98 05 30.818	102 45 12.1 195 15 23.7 311 32 38.2	282 43 39.8 15 18 44.4 131 41 21.7	Numedahl Morden Walhalla	2,544.6 20,424.2 18,888.0	3.405624 4.310146 4.276186
Windygates elevator <sup>1</sup>	49 00 27.17 98 21 02.51	141 13 08.4 221 50 48.9	321 06 57.9 41 56 05.7	Kaleida North Star	15,877.15 12,754.11	4.2007725 4.1056501
Thornhill school <sup>1</sup>	49 12 05.92 98 13 54.06	0 52 12.5 110 38 47.8	180 52 05.7 290 31 58.4	North Star Darlingford	12,092.69 11,687.71	4.0825230 4.0677294
Sperling elevator <sup>1</sup>	49 30 36.91 97 42 18.36	39 51 47.4 58 40 41.3	219 27 43.3 238 09 52.1	North Star Darlingford	60,291.56 57,692.59	4.7802565 4.7611200
Roland elevator	49 22 07.64 97 56 33.18	19 05 59.7 34 48 29.8 65 47 18.6	198 57 40.2 214 35 14.6 245 27 19.5	Numedahl North Star Darlingford	40,968.77 37,316.55 35,078.43	4.6124529 4.5719015 4.5450401
Kronsgart elevator	49 16 41.58 97 50 48.11	35 30 14.4 54 02 13.4 83 45 02.2	215 17 34.3 233 44 37.6 263 20 42.4	Numedahl North Star Darlingford	35,155.06 34,967.10 39,206.03	4.5459878 4.5436596 4.5933529
Church No. 10 <sup>1</sup>	49 02 39.17 98 12 04.24	156 00 04.8 295 30 29.0	335 58 35.0 115 33 53.8	North Star Numedahl	5,929.70 6,106.89	3.7730327 3.7858201
Homen church <sup>1</sup>	48 56 54.76 98 13 15.05	101 28 36.8 220 56 37.6	281 20 22.2 41 00 55.7	Malda Numedahl	13,609.39 10,605.94	4.1336388 4.0255492
Carman water tank <sup>1</sup>	49 30 21.29 98 00 08.78	9 29 34.4 20 14 28.3	189 23 57.8 200 03 55.7	Numedahl North Star	54,722.55 48,926.89	4.7381663 4.6895476
D. L. S. No. 41	49 11 32.19 98 01 24.67	263 51 10.4	83 51 25.0	Morden	352.74	2.5941002
Olga church <sup>1</sup>	48 47 48.23 98 02 28.85	166 03 34.6 221 29 24.3	345 59 45.4 41 35 49.9	Numedahl Walhalla	25,648.60 15,744.77	4.4090637 4.1971363
D. L. S. No. 42	49 08 27.30 97 45 04.16	123 55 03.6	303 54 58.6	Plum Coulee	161.96	2.2083967
Kane elevator	49 21 16.25 97 43 41.39	4 22 43.3 49 38 45.9 75 04 44.3	184 21 35.6 229 25 34.8 254 35 00.2	Plum Coulee Morden Darlingford	23,733.94 27,738.55 49,266.02	4.3753698 4.4430838 4.6925475
Lowe Farm elevator	49 21 15.54 97 35 27.74	26 34 10.7 46 36 24.1 77 41 21.5	206 26 49.0 226 12 07.0 257 05 23.2	Plum Coulee Numedahl Darlingford	26,420.58 53,830.75 58,945.79	4.4219423 4.7310304 4.7704528
Leroy church <sup>1</sup>	48 55 24.81 97 45 11.23	77 49 14.1 180 01 16.5	257 42 38.0 0 01 16.8	Walhalla Plum Coulee	10,947.48 24,262.78	4.0393143 4.3849405
Altona mill chimney <sup>1</sup>	49 06 20.95 97 33 31.32	105 47 59.8 353 18 11.7	285 39 10.9 173 19 07.0	Plum Coulee Neché	14,733.73 12,770.10	4.1683127 4.1061943
D. L. S. No. 43	49 07 05.37 97 30 16.51	112 36 41.5	292 36 37.0	Altona	128.56	2.109122
Bathgate elevator <sup>1</sup>	48 52 51.40 97 28 25.09	158 58 54.9 235 10 57.2	338 55 59.2 55 19 09.3	Neché Pembina	13,205.67 16,175.19	4.1207604 4.2088493
D. L. S. No. 44	49 07 07.21 97 16 47.59	267 28 29.4	87 28 35.0	Letellier	150.82	2.1784630
Rosenfeldt elevator <sup>1</sup>	49 11 56.04 97 32 55.33	66 57 54.1 294 11 05.7	246 48 37.6 114 23 23.4	Plum Coulee Letellier	16,198.04 21,677.01	4.2094624 4.3359994
Letellier elevator	49 08 06.67 97 18 12.82	47 10 53.8 314 14 25.3 357 31 11.6	227 00 15.3 134 15 35.4 177 31 42.3	Neché Letellier Pembina	23,426.41 2,622.69 19,072.24	4.3697058 3.4187464 4.2804016

<sup>1</sup> No check on this position.



**GEOGRAPHIC POSITIONS OF TRIANGULATION STATIONS, GEORGIA STRAIT  
TO LAKE OF THE WOODS, MAJOR SCHEMES**

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Offshore range mark (west shore Point Roberts).	49 00 08.104 123 06 39.524	36 48 30.2 269 05 47.0	216 40 11.3 89 06 48.4	Parke Avenue	22,525.9 1,651.3	4.352682 3.217826
Shore range mark (west shore Point Roberts).	49 00 08.023 123 05 17.157	40 05 23.2 90 05 41.2 140 51 59	219 56 02.2 270 04 39.0 320 51 58	Parke Offshore range mark Avenue	23,565.3 1,674.1 36.50	4.372273 3.223792 1.56235
Mon. 1	49 00 08.027 123 05 16.953	88 01 59 136 01 13	268 01 59 316 01 12	Shore range mark Avenue	4.15 39.15	0.61813 1.59276
Geoduck	49 03 00.937 123 00 02.208	85 53 03.3 229 26 33.4 312 17 18.3	265 49 44.4 49 30 06.3 132 25 29.0	Delta west base Delta east base Birch Point	5,361.7 7,524.3 17,885.6	3.729302 3.876467 4.252503
Point Roberts, 1934	48 58 35.140 123 01 26.066	191 42 56.5 209 30 39.5 284 20 32.6	11 43 59.8 29 35 15.6 104 29 46.3	Geoduck Delta east base Birch Point	8,385.9 15,059.1 15,418.2	3.923548 4.177798 4.188033
Mon. 4	49 00 08.107 123 02 05.762	205 10 00.4 218 46 52.3 293 01 00.3	25 11 33.7 34 51 58.4 113 10 44.0	Geoduck Delta east base Birch Point	5,899.6 13,128.9 17,107.4	3.770824 4.118229 4.233183
Oertel	48 57 21.217 122 48 57.555	98 36 31.6 107 54 47.7 127 54 41.6 153 13 04.2	278 27 06.9 287 44 53.0 307 46 19.9 333 08 15.1	Point Roberts, 1934 Mon. 4 Geoduck Delta east base	15,395.0 16,836.7 17,106.4 17,238.6	4.187379 4.226256 4.233158 4.236503
Offshore range mark (east side Boundary Bay).	49 00 08.208 122 46 50.139	26 40 55.1 90 05 10.9 108 25 43.3	206 39 19.0 269 53 39.9 288 15 45.3	Oertel Mon. 4 Geoduck	5,772.7 18,610.2 16,952.9	3.761380 4.269752 4.229244
Semiahmoo Lighthouse	48 59 32.864 122 46 57.991	30 53 16.3 93 28 18.1 112 03 07.5 188 18 58.0	210 51 46.1 273 16 53.0 291 53 15.4 8 19 03.9	Oertel Mon. 4 Geoduck Offshore range mark	4,738.2 18,484.6 17,181.0 1,103.4	3.675618 4.266809 4.235048 3.042744
Mon. 5	49 00 08.110 122 45 21.484	60 58 42.1 90 06 17.8 90 06 17.8 106 42 25.1	240 57 29.3 269 53 39.9 270 05 10.9 286 31 20.2	Semiahmoo Lighthouse Mon. 4 Offshore range mark Geoduck	2,243.6 20,412.2 1,801.9 18,671.9	3.350949 4.309889 3.255737 4.271188
Drayton I (U. S. C. & G. S.)	48 58 48.704 122 47 16.800	195 39 29.1 223 41 26.0	15 39 43.2 43 42 53.0	Semiahmoo Lighthouse Mon. 5	1,416.8 3,393.1	3.151206 3.530595
Trap (U. S. C. & G. S.)	48 57 50.350 122 45 52.451	136 25 42.3 157 10 59.6 188 24 47.8	316 24 38.7 337 10 10.1 8 25 11.2	Drayton I Semiahmoo Lighthouse Mon. 5	2,488.4 3,435.8 4,301.9	3.395919 3.536027 4.633662
Miller	48 59 19.332 122 45 00.997	20 50 43.1 71 05 58.5 99 58 48.8 164 33 10.7	200 50 04.3 251 04 16.1 279 57 20.5 344 32 55.3	Trap Drayton I Semiahmoo Lighthouse Mon. 5	2,941.2 2,918.8 2,414.9 1,563.3	3.468522 3.465203 3.382901 3.194046
Creek (U. S. C. & G. S.)	48 57 49.162 122 43 59.148	90 55 25.9 114 36 28.4 155 42 17.6	270 54 00.4 294 33 59.3 335 41 30.9	Trap Drayton I Miller	2,305.0 4,420.6 3,056.3	3.362668 3.645478 3.485190
Whatcom (U. S. G. S.)	48 41 19.671 122 21 34.708	339 06	159 06	Whatcom (U. S. C. & G. S.)	0.14	9.1399-10
Sisters (U. S. G. S.)	48 42 18.138 121 59 09.934	86 22 58.1 135 23	266 06 07.8 315 23	Whatcom (U. S. G. S.) Sisters (U. S. C. & G. S.)	27,558.76 0.51	4.4402597 9.7059-10
Nooksack	48 54 21.196 122 13 22.496	22 38 36.7 321 59 48.2	202 32 26.3 142 10 29.7	Whatcom (U. S. G. S.) Sisters (U. S. G. S.)	20,148.2 28,311.2	4.417442 4.451959
Town	48 44 11.208 122 28 48.056	224 57 36.5 300 50 23.1	45 09 13.1 120 55 48.6	Nooksack Whatcom (U. S. G. S.)	26,674.4 10,322.6	4.426094 4.013790
Toad	48 47 39.300 122 23 41.031	44 19 07.2 347 34 28.5	224 15 16.4 167 36 03.4	Town Whatcom (U. S. G. S.)	8,979.5 12,007.5	3.953252 4.079451
Frances (U. S. C. & G. S.)	48 42 06.709 122 36 17.091	247 13 03.6 274 30 38.6	67 18 41.0 94 41 41.3	Town Whatcom (U. S. G. S.)	9,951.6 18,103.0	3.997892 4.257750
Chuckanut (U. S. C. & G. S.)	48 40 07.391 122 30 37.372	117 58 34.7 196 31 05.3	297 54 19.7 16 32 27.5	Frances (U. S. C. & G. S.) Town	7,865.4 7,856.2	3.895723 3.895211
John	48 46 13.954 122 36 00.258	2 34 49.1 241 19 44.2 260 00 48.2 293 11 53.0 297 06 33.6 329 43 49.0	182 34 36.5 61 36 46.4 80 10 04.3 113 17 18.0 117 17 24.1 149 47 51.6	Frances Nooksack Toad Town Whatcom Chuckanut	7,645.5 31,513.9 15,319.5 9,608.0 19,887.5 13,106.1	3.883405 4.498502 4.185245 3.982635 4.298580 4.117475
Pearson	48 51 11.057 122 36 55.220	291 54 19.7 314 05 15.5 322 28 26.4 353 01 41.2	112 04 17.4 134 16 47.7 142 34 32.9 173 02 22.5	Toad Whatcom Town John	17,470.5 26,211.0 16,342.0 9,245.9	4.242306 4.418484 4.213306 3.965950
Bacon (U. S. G. S.)	48 39 46.316 121 31 09.316	97 56 38.1 180	277 35 35.8 0	Sisters Bacon (U. S. C. & G. S.)	34,694.4 0.25	4.540260 9.4048-10

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Davis.....	48 43 46.558 121 12 05.662	72 30 51.8 87 35 10.0	252 16 32.6 266 59 47.6	Bacon..... Sisters.....	24,536.2 57,795.1	4.389808 4.761891
Glacier.....	48 58 11.401 121 14 21.335	23 18 31 10 11.1 354 04 29.2	203 18 210 57 32.4 174 06 11.3	Glacier (U. S. C. & G. S.)..... Bacon..... Davis.....	1.44 39,851.9 26,858.5	0.1584 4.600449 4.429081
Jack.....	48 46 22.707 120 57 18.070	73 46 51.5 75 11 42.2 136 30 01.0	253 21 25.1 255 00 34.9 316 17 10.2	Bacon..... Davis..... Glacier.....	43,287.8 18,761.6 30,234.0	4.636366 4.273270 4.480495
Hozomeen.....	48 58 56.388 121 00 38.800	26 33 12.1 46 37 00.4 85 20 12.6 350 00 54.8	206 24 34.8 226 14 02.6 265 09 52.0 170 03 26.0	Davis..... Bacon..... Glacier..... Jack.....	31,399.9 51,539.6 16,784.6 23,638.4	4.496928 4.712141 4.224911 4.373618
Lightning.....	49 04 04.478 121 00 54.791	56 26 17.2 358 02 35.9	236 16 08.3 178 02 48.0	Glacier..... Hozomeen.....	19,685.6 9,523.0	4.294149 3.978774
Frosty West.....	49 00 48.890 120 50 48.238	73 54 56.1 116 11 25.5	253 47 30.5 296 03 47.4	Hozomeen..... Lightning.....	12,497.3 13,720.8	4.096815 4.137379
Frosty.....	49 00 38.987 120 50 10.946	76 07 09.4 111 59 18.2	255 59 15.7 291 58 50.1	Hozomeen..... Frosty West.....	13,150.3 817.2	4.118937 2.912347
Smoky.....	48 55 22.464 120 42 18.940	47 48 20.7 106 34 05.0 134 16 58.6 135 34 26.1	227 37 03.8 286 20 15.6 314 10 34.4 315 28 30.0	Jack..... Hozomeen..... Frosty West..... Frosty.....	24,779.9 23,332.5 14,456.3 13,703.1	4.394100 4.367961 4.160056 4.136818
Roche.....	49 02 15.602 120 38 00.610	21 41 30.3 78 33 51.3 80 13 11.5 97 03 41.2	201 38 22.2 258 24 46.7 290 03 38.8 276 46 30.1	Smoky..... Frosty..... Frosty West..... Lightning.....	13,732.6 14,955.7 15,643.1 27,922.8	4.137752 4.174807 4.194324 4.445959
Robinson.....	48 43 36.680 120 34 25.544	100 30 32.9 156 09 40.6	280 13 21.0 336 03 44.3	Jack..... Smoky.....	28,502.7 23,844.7	4.454886 4.377392
Ashnola.....	48 55 19.022 120 23 56.766	30 39 19.1 68 06 39.2 90 23 13.1 126 40 00.6	210 31 25.8 247 41 32.4 270 09 22.3 306 29 17.2	Robinson..... Jack..... Smoky..... Roche.....	25,203.1 44,037.8 22,437.9 21,595.1	4.401454 4.643826 4.350983 4.334356
Princeton.....	49 04 39.348 120 26 52.355	47 41 17.7 72 10 23.8 348 19 51.3	227 29 38.4 252 01 52.2 168 22 03.7	Smoky..... Roche..... Ashnola.....	25,507.9 14,449.3 17,673.5	4.406675 4.156848 4.247322
Sheep (U. S. C. & G. S.).....	48 58 36.203 120 23 14.331	8 04 20.0 110 31 26.8 158 28 39.7	188 03 48.0 290 20 11.1 338 25 55.1	Ashnola..... Roche..... Princeton.....	6,152.1 19,416.3 12,060.9	3.789022 4.288166 4.081379
Goat.....	48 42 16.196 120 22 58.297	100 06 27.3 177 10 54.9	279 57 50.9 357 10 10.9	Robinson..... Ashnola.....	14,266.7 24,211.3	4.154324 4.384018
Rommel.....	48 55 24.722 120 11 44.288	25 29 31 00.1 89 24 00.5 112 55 05.6 132 57 52.5	205 209 22 32.8 269 14 48.3 292 46 25.2 312 46 27.2	Rommel (U. S. C. & G. S.)..... Goat..... Ashnola..... Sheep..... Princeton.....	0.11 27,971.5 14,912.5 15,235.1 26,183.7	9.0294-10 4.446715 4.173550 4.182844 4.401119
Lake View.....	49 02 38.302 120 09 29.001	11 37 11.4 52 31 39.4 100 07 15.8	191 35 29.3 232 20 44.5 279 54 07.6	Rommel..... Ashnola..... Princeton.....	13,673.4 22,259.1 21,509.1	4.135878 4.347508 4.332622
Windy, 1935.....	48 55 42.078 119 58 10.465	88 13 53.7 133 03 19.6	268 03 40.2 312 54 47.6	Rommel..... Lake View.....	16,575.1 18,858.6	4.219455 4.275510
Tiffany (U. S. G. S.).....	48 40 10.930 119 55 52.563	88 03 96 48 26.3 145 34 04.9 174 25 38.8	268 03 276 28 05.2 325 22 09.0 354 23 55.2	Tiffany (U. S. C. & G. S.)..... Goat..... Rommel..... Windy, 1935.....	2.89 33,475.1 34,264.2 28,900.9	0.4609 4.524722 4.534841 4.460911
Snowy.....	49 02 57.034 119 52 03.900	29 03 12.5 59 54 55.7 88 32 52.1	208 58 35.9 239 40 05.0 268 19 42.8	Windy, 1935..... Rommel..... Lake View.....	15,364.8 27,770.4 21,230.9	4.186528 4.443582 4.326969
Chopaka.....	48 57 27.155 119 47 00.828	18 46 43.2 76 40 18.1 79 34 148 52 47.8	198 40 03.0 256 31 53.2 259 34 328 48 59.1	Tiffany..... Windy, 1935..... Chopaka (U. S. C. & G. S.)..... Snowy.....	33,798.1 14,008.0 3.89 11,907.6	4.528892 4.146375 0.5900 4.075823
Lemanasky (U. S. G. S.).....	48 44 35.733 119 37 15.823	50 59 70 24 24.1 115 38 06.9 128 56 52.5 153 28 25.9	230 59 250 10 24.9 295 12 09.8 308 41 08.0 333 21 05.4	Lemanasky (U. S. C. & G. S.)..... Tiffany..... Rommel..... Windy, 1935..... Chopaka.....	9.28 24,253.6 46,705.3 32,837.8 26,647.7	0.9673 4.384777 4.669366 4.516374 4.425660
Similkameen.....	48 57 23.799 119 37 09.235	90 33 20.1 119 36 30.3	270 25 53.9 299 25 15.0	Chopaka..... Snowy.....	12,035.6 20,895.7	4.080467 4.320056
End.....	49 01 33.257 119 37 07.420	0 16 28.3 57 50 35.9 98 11 00.8	180 16 26.9 237 43 08.1 277 59 43.8	Similkameen..... Chopaka..... Snowy.....	7,706.2 14,259.4 18,391.3	3.886843 4.154101 4.264612

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Osoyoos.....	48 59 21.177 119 29 36.962	68 31 56.1 114 04 10.0 202 02 32.9 255 47 05.8 317 45 58.4	248 26 14.9 293 58 30.0 22 03 37.9 75 50 05.1 137 48 22.1	Similkameen..... End..... Osoyoos north base..... Mon. 118..... Osoyoos south base.....	9,886.9 10,022.8 4,669.5 4,985.2 5,767.9	3.995058 4.000988 3.669274 3.697684 3.761014
Hump.....	48 55 34.553 119 21 31.964	100 07 54.9 120 19 06.4 125 24 29.9	279 56 08.1 300 07 20.6 305 18 24.1	Similkameen..... End..... Osoyoos.....	19,369.6 22,015.2 12,097.8	4.287121 4.342723 4.082706
Sidley.....	49 01 29.833 119 20 52.696	4 09 56.3 69 09 13.6 69 35 55.0 90 24 29.8	184 09 26.7 248 56 56.7 249 29 19.3 270 12 13.9	Hump..... Similkameen..... Osoyoos..... End.....	11,004.1 21,258.0 11,371.9 19,802.5	4.041556 4.327522 4.055832 4.296720
Gillespie.....	49 01 56.798 119 11 54.038	44 55 25.6 85 42 12.2	224 48 09.6 265 35 25.5	Hump..... Sidley.....	16,659.4 10,974.2	4.221604 4.040372
Balsam.....	48 56 34.876 119 11 23.887	81 30 03.5 128 17 31.2 176 28 32.9	261 22 25.0 308 10 22.0 356 28 10.1	Hump..... Sidley..... Gillespie.....	12,515.5 14,723.5 9,963.5	4.097448 4.168010 3.998412
Bonaparte (U. S. G. S.).....	48 47 07.777 119 07 15.714	82 54 26.5 111 44 11.0 126 25 09.3 148 05 22.6 168 22 07.1	262 31 52.8 291 14 14.3 306 02 38.9 327 55 06.8 348 18 37.2	Lemanasky..... Chopaka..... End..... Sidley..... Gillespie.....	37,060.1 52,234.7 45,233.7 31,400.0 28,041.5	4.568907 4.717959 4.655462 4.496929 4.447802
Bolster.....	48 58 21.234 119 05 05.731	66 54 47.4 128 47 12.1	246 50 02.2 308 42 03.9	Balsam..... Gillespie.....	8,365.2 10,640.3	3.922475 4.026952
Tipple.....	49 02 10.368 118 59 49.700	42 15 17.4 88 26 37.9	222 11 18.9 268 17 31.0	Bolster..... Gillespie.....	9,558.2 14,718.9	3.980376 4.167874
Copper.....	48 57 19.615 118 58 56.206	84 53 14.8 104 14 58.8 118 31 04.0 173 06 08.7	264 43 51.0 284 10 20.1 298 21 17.0 353 05 28.3	Balsam..... Bolster..... Gillespie..... Tipple.....	15,275.6 7,753.7 17,981.8 9,047.4	4.183997 3.889510 4.254833 3.956524
Knob.....	48 59 04.201 118 47 44.725	76 45 38.1 111 23 57.4	256 37 11.6 291 14 50.2	Copper..... Tipple.....	14,033.8 15,815.6	4.147174 4.199085
Midway.....	49 01 43.050 118 46 41.288	14 43 39.3 61 30 01.6 93 05 57.0	194 42 51.4 241 20 47.0 272 56 01.7	Knob..... Copper..... Tipple.....	5,073.6 17,013.0 16,037.2	3.705319 4.230780 4.205128
White.....	48 59 06.026 118 41 00.789	89 38 56.9 125 03 53.5	269 33 52.1 304 59 36.5	Knob..... Midway.....	8,213.1 8,450.8	3.914509 3.926900
Fir.....	48 59 22.157 118 38 52.004	79 14 16.7 114 34 47.3	259 12 39.5 294 28 53.1	White..... Midway.....	2,665.4 10,483.2	3.425758 4.020494
Paris.....	49 01 28.067 118 37 08.653	28 22 50.2 47 06 01.6 71 05 41.7 92 20 18.4	208 21 32.2 227 03 06.4 250 57 41.6 272 13 06.1	Fir..... White..... Knob..... Midway.....	4,420.5 6,443.0 13,670.3 11,642.4	3.645467 3.809091 4.135778 4.066044
Eagle.....	49 03 19.776 118 31 29.494	50 48 56.9 63 25 32.2	230 43 22.8 243 21 16.0	Fir..... Paris.....	11,606.5 7,704.4	4.064701 3.886737
Hardy.....	49 01 45.603 118 31 08.008	64 52 40.8 85 48 33.0 171 28 19.4	244 46 50.6 265 44 00.7 351 28 03.2	Fir..... Paris..... Eagle.....	10,418.8 7,346.6 2,941.7	4.017817 3.866085 3.468902
Grand Forks.....	49 02 18.602 118 26 42.376	69 53 28.9 79 19 44.0 83 04 11.1 107 59 18.9	249 44 18.1 259 16 23.4 262 56 18.2 287 55 42.1	Fir..... Hardy..... Paris..... Eagle.....	15,796.5 5,491.1 12,817.2 6,129.1	4.198562 3.739657 4.107794 3.787396
Danville west base.....	49 00 21.294 118 28 25.102	128 12 48.1 145 49 44.8 209 55 41.5	308 10 45.1 325 47 25.6 29 56 59.1	Hardy..... Eagle..... Grand Forks.....	4,211.9 6,665.6 4,181.9	3.624475 3.823839 3.621373
Danville east base.....	49 00 21.146 118 26 56.532	90 09 18.6 184 31 50.2	270 08 11.7 4 32 00.9	Danville west base..... Grand Forks.....	1,800.1 3,639.8	3.255290 3.561079
Clement.....	49 01 32.366 118 28 48.792	240 54 10.1 313 57 09.6 347 37 49.9	60 55 45.5 133 58 34.3 167 38 07.7	Grand Forks..... Danville east base..... Danville west base.....	2,938.4 3,169.2 2,247.7	3.468113 3.500950 3.351732
Sitcum.....	48 58 48.353 118 25 30.052	93 44 54.6 109 14 02.7 128 35 46.8 138 58 49.4 167 15 23.2	273 34 49.5 289 05 15.4 308 31 31.7 318 54 18.1 347 14 28.6	Fir..... Paris..... Hardy..... Eagle..... Grand Forks.....	16,338.9 15,032.0 8,784.1 11,119.5 6,659.2	4.213224 4.177017 3.943696 4.046067 3.823421
Gilpin.....	49 02 23.646 118 22 03.252	32 18 37.5 57 36 40.5 64 03 53.6 83 59 40.4 88 27 18.1 98 38 05.9	212 16 01.4 237 32 59.0 243 59 05.2 263 52 49.0 268 23 47.3 278 30 58.3	Sitcum..... Danville east base..... Danville west base..... Hardy..... Grand Forks..... Eagle.....	7,867.3 7,058.6 8,629.7 11,127.3 5,671.2 11,628.5	3.895825 3.846721 3.935996 4.046391 3.753674 4.065524

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Cascade.....	49 02 11.800 118 16 43.656	59 37 17.5 93 15 36.3	239 30 40.1 273 11 34.9	Sitcum..... Gilpin.....	12,407.3 6,501.5	4.093678 3.813012
Owl.....	48 58 36.670 118 16 34.204	91 57 11.5 136 23 29.2 178 20 42.9	271 50 27.2 316 19 20.8 358 20 35.8	Sitcum..... Gilpin..... Cascade.....	10,902.4 9,689.2 6,648.5	4.037522 3.986290 3.822724
Horn.....	48 59 06.954 118 03 29.192	86 43 41.1 109 33 40.3	266 33 48.8 289 23 40.6	Owl..... Cascade.....	15,989.7 17,124.9	4.203841 4.233628
Buck.....	49 02 44.787 118 02 50.311	6 42 01.1 65 29 18.2 86 38 30.7	186 41 31.7 245 18 56.2 260 28 01.3	Horn..... Owl..... Cascade.....	6,775.4 18,413.8 16,955.4	3.830938 4.265144 4.229307
Record.....	49 05 49.306 117 52 51.684	46 14 10.9 64 55 48.0	226 06 09.4 244 48 15.7	Horn..... Buck.....	17,947.8 13,421.0	4.254011 4.127785
Northport.....	48 54 31.106 117 52 03.442	121 29 03.0 139 17 18.4 177 19 31.7	301 20 25.8 319 09 10.3 357 18 55.3	Horn..... Buck..... Record.....	16,349.7 20,139.9 20,973.6	4.213509 4.304058 4.321674
Lake (U. S. C. & G. S.).....	49 02 20.035 117 44 43.327	31 45 26.1 123 09 43.4	211 39 54.1 303 03 34.4	Northport..... Record.....	17,028.0 11,834.7	4.231164 4.073157
Beaver (U. S. C. & G. S.).....	49 06 50.600 117 25 12.351	55 15 49.3 70 44 45.0	234 55 33.3 250 30 00.2	Northport..... Lake.....	39,921.7 25,191.9	4.601209 4.401261
Porthill.....	49 01 17.825 116 36 49.859					
Smith.....	48 55 23.070 116 35 49.259	173 35 23.4	353 34 37.7	Porthill.....	11,028.0	4.042496
Hawkins.....	49 01 14.612 116 16 59.186	64 49 38.5 90 21 35.8	244 35 26.0 270 06 36.9	Smith..... Porthill.....	25,419.4 24,191.7	4.405166 4.383667
Hell Roaring (U. S. G. S.).....	48 54 31.662 116 13 10.010	93 25 35.4 113 37 52.1 159 29 36.8	273 08 30.9 293 20 01.1 339 26 43.9	Smith..... Porthill..... Hawkins.....	27,720.3 31,487.9 13,291.9	4.442798 4.498144 4.123588
Ewing (U. S. G. S.).....	48 55 45.637 115 58 49.601	82 39 31.3 114 45 00.7 266 57	262 28 42.6 294 31 18.5 86 57	Hell Roaring..... Hawkins..... Ewing (U. S. C. & G. S.).....	17,667.6 24,379.3 5.62	4.247177 4.387021 0.7497
Hunter.....	49 01 27.533 116 06 20.756	88 18 16.5 318 58 01.0	268 10 14.4 139 03 41.5	Hawkins..... Ewing.....	12,977.1 13,991.3	4.113178 4.145859
Mahon.....	49 06 09.371 115 59 06.793	45 22 57.5 67 24 55.3 358 57 12.4	225 17 29.8 247 11 25.2 178 57 25.6	Hunter..... Hawkins..... Ewing.....	12,386.0 23,598.2 19,271.4	4.092930 4.372879 4.284914
Burke.....	48 59 14.851 115 58 15.229	6 09 38.3 64 25 47.1 99 19 02.0 112 36 26.6 175 19 49.6	186 09 12.5 244 14 32.3 279 04 53.6 292 30 20.2 355 19 10.6	Ewing..... Hell Roaring..... Hawkins..... Hunter..... Mahon.....	6,500.4 20,199.0 23,141.5 10,685.1 12,848.0	3.812942 4.305329 4.364391 4.028779 4.108836
Lodge.....	49 03 44.874 115 47 02.110	58 41 18.4 106 57 40.9	238 32 50.2 286 48 33.2	Burke..... Mahon.....	16,018.4 15,368.2	4.204618 4.186623
Roswell.....	48 57 32.578 115 46 06.057	78 04 29.3 102 06 12.2 135 16 15.7 174 20 58.1	257 54 53.6 281 57 02.1 315 06 26.1 354 20 15.8	Ewing..... Burke..... Mahon..... Lodge.....	15,882.6 15,162.0 22,503.2 11,557.1	4.200921 4.180757 4.352244 4.062849
Bevis.....	49 03 57.284 115 35 20.955	47 52 24.7 88 31 50.3	227 44 17.7 268 23 00.6	Roswell..... Lodge.....	17,694.2 14,238.6	4.247831 4.153468
Wood.....	48 59 05.773 115 33 58.758	79 03 43.8 118 31 43.0 169 30 11.9	258 54 35.2 298 21 51.6 349 29 09.9	Roswell..... Lodge..... Bevis.....	15,069.0 18,100.4 9,158.8	4.178065 4.257687 3.961839
Caribou.....	48 59 34.813 115 30 44.218	77 14 26.6 146 17 38.9	257 11 59.8 325 14 10.0	Wood..... Bevis.....	4,055.6 9,866.4	3.608054 3.994159
Yaak.....	48 58 01.443 115 24 39.791	87 03 99 58 29.9 111 18 20.5 130 13 24.1	267 03 279 51 28.1 291 13 45.5 310 05 20.1	Yaak (U. S. C. & G. S.)..... Wood..... Caribou..... Bevis.....	0.39 11,539.5 7,951.9 17,046.0	9.5888-10 4.062187 3.900471 4.231623
Purcell.....	49 01 05.891 115 24 25.875	2 50 38.1 69 56 31.5 111 46 11.7	182 50 27.6 249 51 45.9 291 37 57.0	Yaak..... Caribou..... Bevis.....	5,704.9 8,188.0 14,318.9	3.756248 3.913176 4.155909
Kootenai.....	49 05 35.827 115 21 07.157	17 07 35.7 46 28 49.2	197 04 55.2 226 21 33.4	Yaak..... Caribou.....	14,686.3 16,177.7	4.166912 4.208917
Frost.....	49 04 19.036 115 11 07.117	54 50 49.3 69 53 19.1 101 05 15.0	234 40 35.8 249 43 15.9 280 57 41.5	Yaak..... Purcell..... Kootenai.....	20,216.5 17,283.6 12,405.3	4.305707 4.237633 4.093606
Gateway.....	49 00 07.884 115 10 09.628	77 38 30.5 95 58 09.9 171 26 50.2	257 27 33.9 275 47 23.6 351 26 06.8	Yaak..... Purcell..... Frost.....	18,118.5 17,492.7 7,845.9	4.258123 4.242856 3.894644

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Campbell.....	48 57 40.017 115 09 10.208	92 06 07.9 108 57 28.0 135 20 13.1 165 11 25.1 109 06 14.4	271 54 26.7 288 45 57.0 315 11 11.8 345 10 40.3 349 04 46.2	Yaak..... Purcell..... Kootenai..... Gateway..... Frost.....	18,920.0 19,672.2 20,692.6 4,724.9 12,553.2	4.276921 4.293853 4.315815 3.674395 4.098754
Bowdich.....	48 59 35.557 115 09 17.616	133 22 21.8 357 34 55.7	313 21 42.6 177 35 01.3	Gateway..... Campbell.....	1,454.3 3,572.4	3.162862 3.552957
Young.....	48 58 32.521 115 10 44.124	193 23 15.4 222 04 55.1 310 19 29.6	13 23 41.4 42 06 00.3 130 20 40.4	Gateway..... Bowdich..... Campbell.....	3,028.2 2,624.0 2,505.9	3.481189 3.418972 3.398961
Gateway north base.....	48 59 33.904 115 10 15.927	186 57 14.2 267 31 38.0 339 11 33.5	6 57 19.0 87 32 22.0 159 12 23.1	Gateway..... Bowdich..... Campbell.....	1,057.5 1,186.5 3,763.4	3.024277 3.074269 3.575583
Gateway south base.....	48 58 54.450 115 10 09.362	173 45 05.2 219 38 09.4 332 22 25.5	353 45 00.2 39 38 48.4 152 23 10.1	Gateway north base..... Bowdich..... Campbell.....	1,226.09 1,649.1 2,595.1	3.088522 3.217238 3.414147
Baldy.....	49 02 35.078 114 58 40.050	54 37 42.7 102 01 59.7	234 29 47.1 281 52 35.4	Campbell..... Frost.....	15,720.3 15,503.8	4.196462 4.190437
Green.....	48 57 40.241 114 55 59.047	90 03 29.5 123 49 29.9 160 15 14.2	269 53 32.7 303 38 04.4 340 13 12.7	Campbell..... Frost..... Baldy.....	16,093.7 22,186.1 9,678.0	4.206657 4.346081 3.985786
Wam.....	48 57 19.341 114 48 35.187	94 08 10.8 128 29 20.2	274 02 36.1 308 21 43.8	Green..... Baldy.....	9,052.6 15,693.7	3.956771 4.195726
Wig.....	49 01 46.983 114 45 25.770	24 59 35.5 59 26 12.2 95 20 42.2	204 57 12.5 239 18 14.3 275 10 42.5	Wam..... Green..... Baldy.....	9,120.6 14,960.6 16,201.2	3.960023 4.174948 4.209546
Canada.....	49 04 07.753 114 41 50.958	45 06 36.4 55 18 12.8 82 09 03.8	225 03 54.1 235 07 32.6 261 56 21.6	Wig..... Green..... Baldy.....	6,159.4 20,963.0 20,687.0	3.789537 4.321867 4.315698
Tuchuck.....	48 58 34.783 114 40 25.919	76 52 16.3 85 01 28.4 108 34 33.7 134 17 00.2 170 28 26.2	256 46 07.2 264 49 44.5 288 20 47.9 314 13 13.9 350 27 22.0	Wam..... Green..... Baldy..... Wig..... Canada.....	10,221.0 19,053.4 23,441.5 8,508.5 10,430.1	4.009492 4.279972 4.369985 3.929853 4.018289
Hefty.....	48 59 53.932 114 34 17.940	71 56 26.5 104 30 06.1 130 28 54.9	251 51 48.8 284 21 41.9 310 23 12.8	Tuchuck..... Wig..... Canada.....	7,870.9 14,012.8 12,089.5	3.896024 4.146524 4.082409
Kishenehn.....	49 03 40.908 114 20 09.375	67 57 15.4 69 11 30.3 91 56 03.3	247 46 34.7 248 56 11.9 271 39 40.0	Hefty..... Tuchuck..... Canada.....	18,609.2 26,465.5 26,434.7	4.269728 4.422680 4.422174
Kintla.....	48 56 43.474 114 14 19.035	96 19 16.4 103 41 29.5 112 24 28.3 151 07 46.9	275 59 34.6 283 26 25.1 292 03 41.4 331 03 22.5	Tuchuck..... Hefty..... Canada..... Kishenehn.....	32,058.6 25,082.6 36,299.4 14,730.5	4.505944 4.399372 4.559540 4.168218
Starvation.....	49 02 17.138 114 16 02.532	117 19 55.0 348 27 07.0	297 16 48.6 168 28 25.1	Kishenehn..... Kintla.....	5,640.9 10,520.0	3.751352 4.022015
North Divide.....	49 04 57.990 114 07 51.954	27 17 02.2 63 32 08.9 81 02 15.1	207 12 10.0 243 25 58.3 260 52 58.0	Kintla..... Starvation..... Kishenehn.....	17,182.5 11,130.3 15,155.5	4.235086 4.046505 4.180571
South Divide.....	48 59 31.496 114 03 50.457	67 58 08.1 109 03 32.0 154 05 26.6	247 50 13.8 288 54 19.3 334 02 24.2	Kintla..... Starvation..... North Divide.....	13,798.0 15,731.2 11,215.4	4.136817 4.196762 4.049816
Waterton.....	49 01 24.967 113 58 06.098	63 25 51.2 119 00 46.6	243 21 31.3 298 53 24.1	South Divide..... North Divide.....	7,827.2 13,594.4	3.893606 4.133360
Campbell S. W.....	48 58 40.945 113 56 14.764	99 36 51.7 129 30 27.2 155 56 43.6	279 31 07.9 309 21 40.8 335 55 19.6	South Divide..... North Divide..... Waterton.....	9,395.9 18,336.9 5,549.3	3.972939 4.263326 3.744235
Sofa.....	49 01 49.860 113 47 04.607	62 29 48.4 86 47 39.0	242 22 53.2 266 39 19.6	Campbell S. W..... Waterton.....	12,612.9 13,460.2	4.100816 4.129053
Belly.....	48 57 18.650 113 45 24.432	100 56 49.4 116 14 54.7 166 20 54.4	280 48 38.8 296 05 19.9 346 19 38.7	Campbell S. W..... Waterton..... Sofa.....	13,469.6 17,253.5 8,622.0	4.129356 4.236877 3.935609
Rim.....	49 01 16.264 113 37 18.023	53 27 57.9 95 02 18.6	233 21 50.9 274 54 55.7	Belly..... Sofa.....	12,315.7 11,062.0	4.090458 4.077802
Chief Mountain.....	48 55 57.814 113 36 31.531	103 01 24.5 130 15 29.1 174 30 54.9	282 54 42.7 310 07 31.4 354 30 19.8	Belly..... Sofa..... Rim.....	11,127.8 16,851.6 9,882.7	4.046408 4.226641 3.994876
Pike.....	48 58 01.824 113 27 58.003	69 55 07.4 117 52 31.0	249 48 40.1 297 45 28.3	Chief Mountain..... Rim.....	11,128.7 12,871.8	4.046443 4.109638

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Police.....	49 01 27.112 113 27 12.485	8 18 21.6 48 14 08.3 88 30 11.0	188 17 47.2 228 07 06.4 268 22 33.7	Pike..... Chief Mountain..... Rim.....	6,408.8 15,255.0 12,307.2	3.806778 4.183413 4.090161
St. Mary.....	49 01 34.862 113 20 21.336	54 42 46.9 88 24 03.5	234 37 02.1 268 18 53.0	Pike..... Police.....	11,379.1 835.6	4.056107 2.922013
Spider.....	48 57 30.101 113 19 43.424	95 36 54.4 128 46 34.8 174 11 01.5	275 30 41.3 308 40 55.9 354 10 32.9	Pike..... Police..... St. Mary.....	10,108.0 11,702.5 7,600.2	4.004665 4.068280 3.880827
St. Mary north base.....	48 59 43.716 113 22 53.373	221 58 00.7 316 52 43.2	41 59 55.5 136 55 06.5	St. Mary..... Spider.....	4,618.9 5,653.1	3.664543 3.752286
St. Mary south base.....	48 58 04.381 113 23 31.788	194 16 38.3 210 44 50.3 282 49 06.3	14 17 07.3 30 47 23.0 102 51 58.6	St. Mary north base..... St. Mary..... Spider.....	3,166.5 7,567.3 4,764.4	3.500574 3.878943 3.678004
Galbreath.....	48 55 48.360 113 15 32.244	90 47 03.5 105 16 42.0 121 36 47.3 151 15 15.0	270 31 14.1 285 07 19.6 301 33 37.9 331 11 36.9	Chief Mountain..... Pike..... Spider..... St. Mary.....	25,633.3 15,724.1 6,000.2 12,212.0	4.408804 4.196566 4.778165 4.086786
373-S.....	48 59 52.693 113 13 25.878	18 49 09.8 60 11 40.0 110 32 27.3	198 47 34.4 240 06 55.1 290 27 13.6	Galbreath..... Spider..... St. Mary.....	7,973.4 8,851.3 9,013.3	3.901646 3.947009 3.954882
Stack.....	48 58 04.533 113 08 10.962	64 56 35.2 117 35 20.4	244 51 02.4 297 31 22.8	Galbreath..... 373-S.....	9,915.2 7,222.5	3.996303 3.858690
Milk.....	49 00 16.771 113 03 44.024	53 03 35.7 60 08 56.2 86 27 44.2	233 00 14.3 240 00 02.0 266 20 25.2	Stack..... Galbreath..... 373-S.....	6,792.9 16,620.7 11,849.9	3.832055 4.220649 4.073715
Lincoln.....	48 54 57.805 113 02 11.847	95 33 31.3 128 19 20.1 169 14 06.0 240 20	275 23 27.9 308 14 49.3 349 12 56.5 60	Galbreath..... Stack..... Milk..... Musssetter (U. S. C. & G. S.).....	16,368.7 9,310.1 10,030.1 3.41	4.214014 3.968956 4.001307 0.53275
New.....	48 57 33.331 112 56 45.765	54 07 52.0 120 44 23.8	234 03 46.1 300 39 08.2	Lincoln..... Milk.....	819.3 989.0	2.913432 2.995216
Bunch.....	49 00 24.912 112 56 22.965	5 00 03.7 35 07 05.0 88 26 21.3	184 59 46.5 215 02 41.8 268 20 48.4	New..... Lincoln..... Milk.....	5,320.6 12,348.0 8,967.5	3.725964 4.091596 3.952673
Gap.....	48 58 57.158 112 55 23.889	32 45 05.5 156 06 45.9	212 44 03.7 336 06 01.3	New..... Bunch.....	3,078.7 2,965.0	3.488373 3.472018
Ridge.....	48 58 49.240 112 52 44.285	64 30 09.7 94 19 35.0 123 38 21.6 176 11	244 27 07.7 274 17 34.7 303 35 36.7 356 11	New..... Gap..... Bunch..... Ridge (U. S. C. & G. S.).....	5,442.5 3,254.6 5,338.3 3.74	3.735795 3.512493 3.727401 0.5723
Bluff.....	49 01 13.341 112 51 55.037	12 40 41.6 45 16 48.9 74 39 47.7	192 40 04.4 225 14 11.3 254 36 25.5	Ridge..... Gap..... Bunch.....	4,562.6 5,976.5 5,646.3	3.659217 3.776446 3.751761
Center.....	48 59 18.687 112 46 04.725	83 39 10.8 116 29 06.5	263 34 09.3 296 24 42.1	Ridge..... Bluff.....	8,174.8 7,952.2	3.912477 3.900486
Bench.....	49 00 11.858 112 45 05.914	36 03 20.8 74 43 52.1 102 54 39.9	216 02 36.4 254 38 06.2 282 49 31.1	Center..... Ridge..... Bluff.....	2,031.6 9,661.6 8,528.2	3.307830 3.985051 3.930855
South.....	48 57 00.595 112 44 11.892	107 54 12.1 151 43 57.6 169 28 21.4	287 47 45.6 331 42 32.5 349 27 40.7	Ridge..... Center..... Bench.....	10,949.3 4,844.0 6,009.6	4.039386 3.685202 3.778849
Table.....	49 00 58.021 112 40 44.491	29 55 09.7 75 00 07.3	209 52 33.2 254 56 50.0	South..... Bench.....	8,460.4 5,500.8	3.927390 3.740423
Bend.....	48 58 04.510 112 39 10.691	72 10 15.4 118 36 50.6 160 25 34.9	252 06 28.2 296 32 22.6 340 24 24.1	South..... Bench..... Table.....	6,437.5 8,224.3 5,689.1	3.808718 3.915099 3.755046
River.....	49 02 30.609 112 34 41.065	33 42 54.9 68 51 35.6	213 39 31.5 248 47 01.2	Bend..... Table.....	9,879.1 7,917.1	3.994719 3.898564
Antelope.....	48 58 13.134 112 29 14.636	88 48 12.8 110 02 01.4 140 12 04.2	268 40 43.2 289 53 20.8 320 07 57.8	Bend..... Table..... River.....	12,125.9 14,920.3 10,357.7	4.083715 4.173779 4.015263
Line.....	48 59 29.296 112 24 05.174	69 31 54.9 113 30 07.9	249 28 01.3 293 22 07.8	Antelope..... River.....	6,718.0 14,063.0	3.827242 4.148696
Foot.....	49 02 02.899 112 23 44.996	4 56 27.9 43 22 59.1 93 44 39.3	184 56 12.7 223 18 50.3 273 36 23.9	Line..... Antelope..... River.....	4,762.8 9,760.6 13,353.1	3.677858 3.989476 4.125582
Track.....	48 59 42.649 112 22 27.764	78 14 35.6 160 05 47.6	258 13 22.1 340 04 49.3	Line..... Foot.....	2,022.7 4,608.0	3.305940 3.663516
Clear.....	48 58 31.382 112 20 55.589	114 54 57.3 139 36 08.8	294 52 34.3 319 34 59.3	Line..... Track.....	4,249.7 2,891.2	3.628361 3.461078

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Lake.....	49 01 52.102 112 17 53.120	30 54 12.0 54 24 19.1 92 42 30.1	210 51 54.3 234 20 51.8 272 38 04.4	Clear..... Track..... Foot.....	7,225.0 6,865.9 7,155.4	3.858841 3.836695 3.854633
Corner.....	48 58 05.228 112 17 32.980	101 06 53.3 176 39 33.2	281 04 20.4 356 39 18.0	Clear..... Lake.....	4,199.0 7,020.5	3.623151 3.846366
Horse.....	49 01 45.885 112 15 33.650	19 36 00.6 47 28 26.9 93 53 34.2	199 34 30.6 227 24 24.0 273 51 49.0	Corner..... Clear..... Lake.....	7,235.2 8,883.6 2,639.7	3.859448 3.948591 3.453268
Cairn.....	48 58 11.870 112 09 52.469	88 47 35.7 133 40 01.3	268 41 48.4 313 35 43.8	Corner..... Horse.....	9,368.5 9,581.4	3.971668 3.981427
Red.....	49 00 23.582 112 07 21.379	37 04 02.4 71 05 43.6 104 18 48.4	217 02 08.4 250 58 02.1 294 12 36.8	Cairn..... Corner..... Horse.....	5,098.1 13,148.6 10,320.4	3.707412 4.118881 4.013698
Crook.....	49 01 13.288 112 03 04.567	55 59 19.9 73 37 52.2	235 54 12.1 253 34 38.4	Cairn..... Red.....	10,006.2 5,439.8	4.000354 3.735582
Cliff.....	48 58 47.055 112 02 49.787	82 50 15.7 118 24 04.0 176 11 47.9	262 44 56.8 298 20 39.0 356 11 36.7	Cairn..... Red..... Crook.....	8,664.3 6,275.0 4,527.4	3.937732 3.797610 3.658645
Tennant.....	49 01 01.830 111 58 24.606	52 20 43.7 93 35 23.8	232 17 23.6 273 31 52.4	Cliff..... Crook.....	6,811.0 5,690.4	3.833208 3.755829
Moberly.....	48 58 49.270 111 57 45.173	89 23 55.6 124 27 21.6 168 55 45.1	290 20 05.9 304 23 20.6 348 55 15.4	Cliff..... Crook..... Tennant.....	6,194.5 7,870.1 4,172.7	3.792004 3.895982 3.620415
Peg.....	49 00 07.820 111 59 09.519	208 40 33.1 324 44 38.7	28 41 07.1 144 45 42.4	Tennant..... Moberly.....	1,901.8 2,971.2	3.279160 3.472937
Coutts N. W. base.....	49 00 57.709 111 59 36.220	294 59 33.0 330 21 09.1 340 35 59.8	85 00 27.1 150 22 32.9 160 36 19.9	Tennant..... Moberly..... Peg.....	1,460.7 4,564.8 1,633.9	3.164561 3.659422 3.213220
Coutts S. E. base.....	49 00 40.823 111 58 41.210	29 26 23.1 115 01 18.0 207 28 07.6 341 42 09.1	209 26 01.7 295 00 36.5 27 28 20.2 161 42 51.4	Peg..... Coutts N. W. base..... Tennant..... Moberly.....	1,170.6 1,233.55 731.4 3,629.4	3.068422 3.091157 2.864159 3.559837
Center I.....	49 00 01.906 111 54 50.190	57 46 36.7 113 02 21.4	237 44 24.6 292 59 39.6	Moberly..... Tennant.....	4,205.9 4,734.4	3.623863 3.675263
Coffin.....	49 02 50.079 111 52 06.881	32 34 52.4 42 46 34.2 66 29 26.5	212 32 49.1 222 42 18.8 245 24 41.3	Center I..... Moberly..... Tennant.....	6,164.2 10,128.8 8,369.8	3.789878 4.005560 3.922714
Griffith.....	48 58 20.586 111 50 49.241	96 01 27.0 122 35 59.9 169 16 34.9	275 56 13.2 302 32 58.1 349 15 36.3	Moberly..... Center I..... Coffin.....	8,504.6 5,813.4 8,473.3	3.929653 3.764430 3.928051
Ashe.....	49 03 42.705 111 46 06.140	30 03 39.8 77 31 24.0	210 00 06.1 257 26 51.5	Griffith..... Coffin.....	11,493.8 7,502.7	4.060405 3.875219
Sheep.....	48 57 46.590 111 43 55.552	97 09 27.9 133 14 42.8 166 27 06.0	277 04 15.8 313 08 31.9 346 25 27.4	Griffith..... Coffin..... Ashe.....	8,479.4 13,697.1 11,316.5	3.928367 4.136630 4.053713
Center II.....	48 58 42.678 111 42 01.578	53 14 04.3 151 49 43.2	233 12 38.4 331 46 38.6	Sheep..... Ashe.....	2,894.0 10,516.3	3.461499 4.021864
Milk.....	49 03 49.916 111 35 38.108	39 25 21.3 89 03 53.6	219 20 31.8 268 55 59.2	Center II..... Ashe.....	12,279.4 12,751.4	4.089177 4.105557
Mountain.....	48 58 53.827 111 32 43.832	81 25 30.8 88 19 08.8 118 46 58.2 158 51 23.6	261 17 04.1 288 12 08.0 298 36 52.5 338 49 12.0	Sheep..... Center II..... Ashe..... Milk.....	13,818.0 11,346.6 18,583.6 9,808.1	4.140446 4.054965 4.269130 3.991585
Center III.....	49 00 06.268 111 26 49.500	72 19 55.2 122 34 49.7	252 15 27.8 302 28 10.5	Mountain..... Milk.....	7,561.5 12,734.8	3.878909 4.104992
Roscoe.....	48 57 02.394 111 19 27.584	102 04 58.2 122 37 20.1	281 54 57.6 302 31 46.7	Mountain..... Center III.....	16,557.4 10,664.4	4.218992 4.027938
Breed.....	49 02 29.309 111 18 43.334	5 05 40.1 66 14 53.4 68 47 45.5 96 59 50.4	185 05 06.7 246 08 48.4 248 37 11.1 276 47 03.9	Roscoe..... Center III..... Mountain..... Milk.....	10,138.9 10,795.8 18,331.4 20,754.6	4.005990 4.033255 4.263196 4.317114
Center IV.....	48 59 27.388 111 10 58.416	66 39 48.3 120 47 47.8	246 33 24.2 300 41 56.8	Roscoe..... Breed.....	11,282.6 10,992.1	4.052410 4.041082
Bear.....	49 01 18.446 111 08 47.792	37 44 46.7 100 19 09.6	217 43 08.1 280 11 39.9	Center IV..... Breed.....	4,338.0 12,293.9	3.637286 4.089688
East Butte.....	48 54 08.105 111 07 58.779	111 04 41.5 139 48 51.7 159 41 02.7 175 42 58.1	250 56 02.2 319 40 45.4 339 38 47.2 355 42 21.1	Roscoe..... Breed..... Center IV..... Bear.....	15,019.5 20,286.9 10,518.6 13,331.2	4.176656 4.307215 4.021856 4.124868

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Center V.....	48 59 35.488 111 01 58.107	36 00 16.1 110 56 58.7	215 55 44.1 290 51 49.5	East Butte..... Bear.....	12,495.4 8,912.9	4.094751 3.950018
Laird.....	48 55 20.600 111 00 40.962	75 56 40.3 168 44 09.3	255 51 10.3 348 43 11.1	East Butte..... Center V.....	9,191.7 8,028.7	3.963397 3.904647
Kop.....	49 01 38.671 111 00 20.972	1 59 44.3 27 25 39.7 33 49 54.4 86 34 50.8	181 59 29.3 207 24 26.5 213 44 09.1 266 28 28.2	Laird..... Center V..... East Butte..... Bear.....	11,686.2 4,266.8 16,746.4 10,315.6	4.067675 3.632138 4.223621 4.013493
Center VI.....	48 59 55.172 110 56 03.309	33 41 18.8 121 26 13.5	213 37 49.5 301 22 56.0	Laird..... Kop.....	10,190.3 6,134.9	4.008189 3.787810
Lost.....	49 00 41.254 110 53 52.541	61 50 21.6 102 42 25.9	241 48 42.9 282 37 32.7	Center VI..... Kop.....	3,015.0 8,089.1	3.479284 3.907900
Chester.....	48 53 11.013 110 53 54.472	115 50 58.4 168 09 14.5 180 09 42.1	295 45 52.0 348 07 37.3 0 09 43.5	Laird..... Center VI..... Lost.....	9,195.3 12,757.3 13,906.5	3.963564 4.105758 4.143282
Center VII.....	48 59 09.906 110 48 54.218	28 53 39.7 114 59 11.3	208 49 53.3 294 55 26.1	Chester..... Lost.....	12,659.2 6,688.3	4.102406 3.825318
Strode.....	48 56 58.812 110 44 44.538	57 54 29.0 128 35 48.7	237 47 34.4 308 32 40.3	Chester..... Center VII.....	13,224.1 6,495.3	4.121366 3.812599
Spencer.....	49 02 21.430 110 43 09.250	11 00 32.2 49 52 18.2 76 44 44.1	190 59 20.3 229 47 57.8 256 36 38.4	Strode..... Center VII..... Lost.....	10,152.7 9,173.1 13,430.3	4.006581 3.962517 4.128067
Center VIII.....	48 58 04.989 110 35 25.065	79 52 32.5 130 04 05.5	259 45 30.5 309 58 15.1	Strode..... Spencer.....	11,563.4 12,319.2	4.063086 4.090584
Christianson.....	48 56 01.545 110 31 11.663	96 11 21.6 126 30 51.5 128 53 12.0	276 01 08.5 306 27 40.4 308 44 10.4	Strode..... Center VIII..... Spencer.....	16,636.2 6,412.7 18,723.6	4.221054 3.807044 4.272390
Bar 5.....	49 03 22.716 110 29 50.507	6 54 38.3 34 44 38.9 56 57 47.4 83 25 34.3	186 53 37.1 214 40 26.4 236 46 32.5 263 15 30.9	Christianson..... Center VIII..... Strode..... Spencer.....	13,727.9 11,939.7 21,698.6 16,329.9	4.137605 4.076994 4.336433 4.212964
Center IX.....	48 59 48.196 110 24 02.134	51 20 11.3 133 09 14.7	231 14 47.3 313 04 51.6	Christianson..... Bar 5.....	11,196.1 9,695.6	4.049065 3.986573
Blacktail.....	49 03 34.999 110 22 49.801	11 51 08.6 87 30 01.4	191 50 14.0 267 24 43.6	Center IX..... Bar 5.....	7,158.8 8,549.8	3.854839 3.931966
Pugsley & Simpson.....	48 58 17.301 110 19 56.029	73 06 17.2 119 19 26.9 160 13 49.1	252 57 47.6 299 16 21.2 340 11 37.9	Christianson..... Center IX..... Blacktail.....	14,371.5 5,737.9 10,430.1	4.157502 3.758754 4.018299
Center X.....	49 01 39.597 110 18 14.031	18 21 51.7 122 30 28.9	198 20 34.7 302 27 00.6	Pugsley & Simpson..... Blacktail.....	6,584.2 6,638.8	3.818502 3.822091
Hat.....	49 03 44.208 110 06 31.127	74 58 53.5 89 16 56.6	254 50 02.7 269 04 37.3	Center X..... Blacktail.....	14,764.4 19,870.4	4.169803 4.298206
Havre.....	48 56 46.357 110 06 02.685	99 29 48.6 121 25 37.5 121 46 04.0 177 26 19.8	279 19 20.0 301 16 25.6 301 33 23.8 357 25 58.3	Pugsley & Simpson..... Center X..... Blacktail..... Hat.....	17,183.8 17,411.4 24,049.1 12,921.0	4.235120 4.240833 4.381098 4.111297
Toledo.....	48 55 27.263 109 59 25.108	106 50 36.5 150 36 54.6	286 45 36.8 330 31 33.1	Havre..... Hat.....	8,452.5 17,625.8	3.929966 4.246149
Day.....	49 03 44.798 109 58 51.422	2 33 16.9 34 11 09.0 89 56 10.6	182 32 51.4 214 05 43.5 269 50 23.3	Toledo..... Havre..... Hat.....	15,384.9 15,617.9 9,332.4	4.187094 4.193622 3.969992
Center XI.....	49 01 17.516 109 51 52.547	40 26 00.2 118 11 00.1	220 20 18.8 298 05 43.9	Toledo..... Day.....	14,204.9 9,647.2	4.152438 3.984403
Willow Creek.....	49 05 08.392 109 48 12.144	32 07 46.7 78 48 38.0	212 05 00.2 258 40 35.0	Center XI..... Day.....	8,419.9 13,229.3	3.926309 4.121537
Chinook.....	48 56 42.050 109 47 58.399	80 41 09.6 134 36 15.4 150 47 50.3 178 58 39.9 259 52 31	260 32 31.8 314 28 02.6 330 44 53.6 358 58 29.5 79 52 31	Toledo..... Day..... Center XI..... Willow Creek..... Signal (U. S. C. & G. S.).....	14,166.3 18,620.1 9,750.9 15,644.2 8.03	4.151256 4.269983 3.989046 4.194354 0.90472
Center XII.....	49 02 05.743 109 44 24.423	23 31 57.7 140 41 39.3	203 29 16.3 320 38 47.3	Chinook..... Willow Creek.....	10,904.6 7,294.5	4.037608 3.862994
Police.....	48 56 07.126 109 40 14.559	96 34 07.9 155 23 28.6	276 28 18.1 335 20 18.1	Chinook..... Center XII.....	9,500.6 12,187.5	3.977753 4.085916
Maple.....	49 05 30.964 109 38 27.018	7 09 44.4 35 27 18.4 48 53 28.1 86 42 00.5	187 08 23.2 215 20 07.0 228 48 58.1 266 34 38.2	Police..... Chinook..... Center XII..... Willow Creek.....	17,554.4 20,043.5 9,635.0 11,892.6	4.244386 4.301974 3.983850 4.075278



## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Lake.....	49 01 52.102 112 17 53.120	30 54 12.0 54 24 19.1 92 42 30.1	210 51 54.3 234 20 51.8 272 38 04.4	Clear..... Track..... Foot.....	7,225.0 6,865.9 7,155.4	3.858841 3.836695 3.854633
Corner.....	48 58 05.228 112 17 32.980	101 06 53.3 176 39 33.2	281 04 20.4 356 39 18.0	Clear..... Lake.....	4,109.0 7,020.5	3.623151 3.846366
Horse.....	49 01 45.885 112 15 33.650	19 36 00.6 47 28 26.9 93 53 34.2	199 34 30.6 227 24 24.0 273 51 49.0	Corner..... Clear..... Lake.....	7,235.2 8,883.6 2,839.7	3.859448 3.948591 3.453268
Cairn.....	48 58 11.870 112 09 52.469	88 47 35.7 133 40 01.3	268 41 48.4 313 35 43.8	Corner..... Horse.....	9,368.5 9,581.4	3.971668 3.981427
Red.....	49 00 23.582 112 07 21.379	37 04 02.4 71 05 43.6 104 18 48.4	217 02 08.4 250 58 02.1 284 12 36.8	Cairn..... Corner..... Horse.....	5,098.1 13,148.6 10,320.4	3.707412 4.118881 4.013698
Crook.....	49 01 13.288 112 03 04.567	55 59 19.9 73 37 52.2	235 54 12.1 253 34 38.4	Cairn..... Red.....	10,008.2 5,439.8	4.000354 3.735582
Cliff.....	48 58 47.055 112 02 49.787	82 50 15.7 118 24 04.0 176 11 47.9	262 44 56.8 298 20 39.0 356 11 36.7	Cairn..... Red..... Crook.....	8,664.3 6,275.0 4,527.4	3.937732 3.797611 3.655845
Tennant.....	49 01 01.830 111 58 24.606	52 20 43.7 93 35 23.8	232 17 23.6 273 31 52.4	Cliff..... Crook.....	6,811.0 5,690.4	3.833208 3.755829
Moberly.....	48 58 49.270 111 57 45.173	89 23 55.6 124 27 21.6 168 55 45.1	269 20 05.9 304 23 20.6 348 55 15.4	Cliff..... Crook..... Tennant.....	6,194.5 7,870.1 4,172.7	3.792004 3.895982 3.620415
Peg.....	49 00 07.820 111 59 09.519	208 40 33.1 324 44 38.7	28 41 07.1 144 45 42.4	Tennant..... Moberly.....	1,901.8 2,971.2	3.279160 3.472937
Coutts N. W. base.....	49 00 57.709 111 59 36.220	264 59 33.0 330 21 09.1 340 35 59.8	85 00 27.1 150 22 32.9 160 36 19.9	Tennant..... Moberly..... Peg.....	1,460.7 4,564.8 1,633.9	3.164561 3.659422 3.213220
Coutts S. E. base.....	49 00 40.823 111 58 41.210	29 26 23.1 115 01 18.0 207 28 07.6 341 42 09.1	209 26 01.7 295 00 36.5 27 28 20.2 161 42 51.4	Peg..... Coutts N. W. base..... Tennant..... Moberly.....	1,170.6 1,233.55 731.4 3,629.4	3.068422 3.091157 2.864159 3.559837
Center I.....	49 00 01.906 111 54 50.190	57 46 36.7 113 02 21.4	237 44 24.6 292 59 39.6	Moberly..... Tennant.....	4,205.9 4,734.4	3.623863 3.675263
Coffin.....	49 02 50.079 111 52 06.881	32 34 52.4 42 46 34.2 66 29 26.5	212 32 49.1 222 42 18.8 245 24 41.3	Center I..... Moberly..... Tennant.....	6,164.2 10,128.8 8,369.8	3.789678 4.005560 3.922714
Griffith.....	48 58 20.586 111 50 49.241	96 01 27.0 122 35 59.9 169 16 34.9	275 56 13.2 302 32 58.1 349 15 36.3	Moberly..... Center I..... Coffin.....	8,504.6 5,813.4 8,473.3	3.929653 3.764430 3.929051
Ashe.....	49 03 42.705 111 46 06.140	30 03 39.8 77 31 24.0	210 00 06.1 257 26 51.5	Griffith..... Coffin.....	11,493.8 7,502.7	4.060465 3.875219
Sheep.....	48 57 46.590 111 43 55.552	97 09 27.9 133 14 42.8 166 27 06.0	277 04 15.8 313 08 31.9 346 25 27.4	Griffith..... Coffin..... Ashe.....	8,479.4 13,697.1 11,316.5	3.928367 4.136630 4.053713
Center II.....	48 58 42.678 111 42 01.578	53 14 04.3 151 49 43.2	233 12 38.4 331 46 38.6	Sheep..... Ashe.....	2,894.0 10,516.3	3.461499 4.021864
Milk.....	49 03 49.916 111 35 38.108	39 25 21.3 89 03 53.6	219 20 31.8 268 55 59.2	Center II..... Ashe.....	12,279.4 12,751.4	4.089177 4.105557
Mountain.....	48 58 53.827 111 32 43.832	81 25 30.8 88 19 08.8 118 46 55.2 158 51 23.6	261 17 04.1 268 12 08.0 298 36 52.5 338 49 12.0	Sheep..... Center II..... Ashe..... Milk.....	13,818.0 11,346.6 18,583.6 9,808.1	4.140446 4.054865 4.269130 3.991585
Center III.....	49 00 08.268 111 26 49.600	72 19 55.2 122 34 49.7	252 15 27.8 302 28 10.5	Mountain..... Milk.....	7,561.5 12,734.8	3.878909 4.104992
Roscoe.....	48 57 02.394 111 19 27.584	102 04 58.2 122 37 20.1	281 54 57.6 302 31 46.7	Mountain..... Center III.....	16,557.4 10,664.4	4.218992 4.027938
Breed.....	49 02 29.309 111 18 43.334	5 05 40.1 66 14 55.4 68 47 45.5 96 59 50.4	185 05 06.7 246 08 48.4 248 37 11.1 276 47 03.9	Roscoe..... Center III..... Mountain..... Milk.....	10,138.9 10,795.8 18,331.4 20,764.6	4.005990 4.033255 4.263196 4.317114
Center IV.....	48 59 27.388 111 10 58.416	66 39 48.3 120 47 47.8	246 33 24.2 300 41 56.8	Roscoe..... Breed.....	11,282.6 10,992.1	4.052410 4.041062
Bear.....	49 01 18.446 111 08 47.792	37 44 46.7 100 19 09.6	217 43 08.1 280 11 39.9	Center IV..... Breed.....	4,338.0 12,293.9	3.637286 4.089688
East Butte.....	48 54 08.105 111 07 58.779	111 04 41.5 139 48 51.7 159 41 02.7 175 42 58.1	260 56 02.2 319 40 45.4 339 38 47.2 355 42 21.1	Roscoe..... Breed..... Center IV..... Bear.....	15,019.5 20,286.9 10,518.6 13,331.2	4.176656 4.307215 4.021956 4.124868

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Center V.....	48 59 35.488 111 01 58.107	36 00 16.1 110 56 58.7	215 55 44.1 290 51 49.5	East Butte..... Bear.....	12,495.4 8,912.9	4.096751 3.950018
Laird.....	48 55 20.600 111 00 40.962	75 56 40.3 168 44 09.3	255 51 10.3 348 43 11.1	East Butte..... Center V.....	9,191.7 8,028.7	3.963397 3.904647
Kop.....	49 01 38.671 111 00 20.972	1 59 44.3 27 25 39.7 33 49 54.4 86 34 50.8	181 59 29.3 207 24 26.5 213 44 09.1 266 28 28.2	Laird..... Center V..... East Butte..... Bear.....	11,686.2 4,286.8 16,746.4 10,315.6	4.067675 3.632138 4.223921 4.013493
Center VI.....	48 59 55.172 110 56 03.309	33 41 18.8 121 26 13.5	213 37 49.5 301 22 59.0	Laird..... Kop.....	10,190.3 6,134.9	4.008189 3.787810
Lost.....	49 00 41.254 110 53 52.541	61 50 21.6 102 42 25.9	241 48 42.9 282 37 32.7	Center VI..... Kop.....	3,015.0 8,089.1	3.479284 3.907900
Chester.....	48 53 11.013 110 53 54.472	115 50 58.4 168 09 14.5 180 09 42.1	295 45 52.0 348 07 37.3 0 09 43.5	Laird..... Center VI..... Lost.....	9,195.3 12,757.3 13,908.5	3.963564 4.105758 4.143282
Center VII.....	48 59 09.906 110 48 54.218	28 53 39.7 114 59 11.3	208 49 53.3 294 55 26.1	Chester..... Lost.....	12,659.2 6,688.3	4.102406 3.825318
Strode.....	48 56 58.812 110 44 44.538	57 54 29.0 128 35 48.7	237 47 34.4 308 32 40.3	Chester..... Center VII.....	13,224.1 6,495.3	4.121366 3.812599
Spencer.....	49 02 21.430 110 43 09.250	11 00 32.2 49 52 18.2 76 44 44.1	190 59 20.3 229 47 57.8 256 36 38.4	Strode..... Center VII..... Lost.....	10,152.7 9,173.1 13,430.3	4.006581 3.962517 4.128087
Center VIII.....	48 58 04.989 110 35 25.065	79 52 32.5 130 04 05.5	259 45 30.5 309 58 15.1	Strode..... Spencer.....	11,563.4 12,319.2	4.063086 4.090584
Christianson.....	48 56 01.545 110 31 11.663	96 11 21.6 126 30 51.5 128 53 12.0	276 01 08.5 306 27 40.4 308 44 10.4	Strode..... Center VIII..... Spencer.....	16,636.2 6,412.7 18,723.6	4.221054 3.807044 4.272390
Bar 5.....	49 03 22.716 110 29 50.507	6 54 38.3 34 44 38.9 56 57 47.4 83 25 34.3	186 53 37.1 214 40 26.4 236 46 32.5 263 15 30.9	Christianson..... Center VIII..... Strode..... Spencer.....	13,727.9 11,939.7 21,698.6 16,329.9	4.137605 4.076094 4.336433 4.212984
Center IX.....	48 59 48.196 110 24 02.134	51 20 11.3 133 09 14.7	231 14 47.3 313 04 51.6	Christianson..... Bar 5.....	11,196.1 9,695.6	4.049065 3.986573
Blacktail.....	49 03 34.999 110 22 49.801	11 51 08.6 87 30 01.4	191 50 14.0 267 24 43.6	Center IX..... Bar 5.....	7,158.8 8,549.8	3.854839 3.931956
Pugsley & Simpson.....	48 58 17.301 110 19 56.029	73 06 17.2 119 19 26.9 160 13 49.1	252 57 47.6 299 16 21.2 340 11 37.9	Christianson..... Center IX..... Blacktail.....	14,371.5 5,737.9 10,430.1	4.157502 3.758754 4.018289
Center X.....	49 01 39.597 110 18 14.031	18 21 51.7 122 30 28.9	198 20 34.7 302 27 00.6	Pugsley & Simpson..... Blacktail.....	6,584.2 6,638.8	3.818502 3.822091
Hat.....	49 03 44.208 110 06 31.127	74 58 53.5 89 16 56.6	254 50 02.7 269 04 37.3	Center X..... Blacktail.....	14,784.4 19,870.4	4.169803 4.298206
Havre.....	48 56 46.357 110 06 02.685	99 29 48.6 121 25 37.5 121 46 04.0 177 26 19.8	279 19 20.0 301 16 25.6 301 33 23.8 357 25 58.3	Pugsley & Simpson..... Center X..... Blacktail..... Hat.....	17,183.8 17,411.4 24,049.1 12,921.0	4.235120 4.240833 4.381098 4.111297
Toledo.....	48 55 27.263 109 59 25.108	106 50 36.5 150 36 54.6	286 45 36.8 330 31 33.1	Havre..... Hat.....	8,452.5 17,625.8	3.926986 4.246149
Day.....	49 03 44.798 109 58 51.422	2 33 16.9 34 11 09.0 89 56 10.6	182 32 51.4 214 05 43.5 269 50 23.3	Toledo..... Havre..... Hat.....	15,384.9 15,617.9 9,332.4	4.187094 4.193622 3.969992
Center XI.....	49 01 17.516 109 51 52.547	40 26 00.2 118 11 00.1	220 20 18.8 298 05 43.9	Toledo..... Day.....	14,204.9 9,647.2	4.152438 3.984403
Willow Creek.....	49 05 08.392 109 48 12.144	32 07 46.7 78 48 38.0	212 05 00.2 258 40 35.0	Center XI..... Day.....	8,419.9 13,229.3	3.925309 4.121537
Chinook.....	48 56 42.050 109 47 58.389	80 41 09.6 134 36 15.4 150 47 50.3 178 58 39.9 259 52 31	260 32 31.8 314 28 02.6 330 44 53.6 358 58 29.5 79 52 31	Toledo..... Day..... Center XI..... Willow Creek..... Signal (U. S. C. & G. S.).....	14,166.3 18,620.1 9,750.9 15,644.2 8.03	4.151256 4.269983 3.989046 4.194354 0.90472
Center XII.....	49 02 05.743 109 44 24.423	23 31 57.7 140 41 39.3	203 29 16.3 320 38 47.3	Chinook..... Willow Creek.....	10,904.6 7,294.5	4.037608 3.862994
Police.....	48 56 07.126 109 40 14.559	96 34 07.9 155 23 26.6	276 28 18.1 335 20 18.1	Chinook..... Center XII.....	9,500.6 12,187.5	3.977753 4.085916
Maple.....	49 05 30.964 109 38 27.018	7 09 44.4 35 27 18.4 48 53 28.1 86 42 00.5	187 08 23.2 215 20 07.0 228 48 58.1 266 34 38.2	Police..... Chinook..... Center XII..... Willow Creek.....	17,554.4 20,043.5 9,635.0 11,892.6	4.244386 4.301974 3.983850 4.075278

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Kirk.....	48 56 23.224 109 33 28.669	86 35 50.8 160 19 09.9	266 30 44.7 340 15 24.7	Police..... Maple.....	8,275.5 17,973.8	3.917792 4.254640
Kirk north base.....	48 58 04.536 109 35 54.758	55 34 15.1 316 27 47.5	235 30 59.2 136 29 37.8	Police..... Kirk.....	6,410.6 4,316.1	3.806896 3.635090
Kirk south base.....	48 56 21.524 109 35 15.033	85 51 29.4 165 45 13.0 268 35 57.8	265 47 43.6 345 44 43.0 88 37 18.1	Police..... Kirk north base..... Kirk.....	6,112.1 3,283.20 2,165.2	3.796197 3.516297 3.335505
Todd.....	49 03 59.581 109 31 59.486	7 20 09.9 34 38 13.2 109 47 09.5	187 19 02.6 214 31 59.5 289 42 16.7	Kirk..... Police..... Maple.....	14,213.7 17,727.7 8,355.9	4.152707 4.246522 3.921991
Center XIII.....	49 01 09.161 109 29 55.251	26 11 16.4 154 24 25.0	206 08 35.4 334 22 51.2	Kirk..... Todd.....	9,841.5 5,838.0	3.993062 3.766265
Link.....	48 56 29.007 109 21 25.382	89 22 50.1 129 54 23.4	269 13 44.7 309 47 58.7	Kirk..... Center XIII.....	14,720.2 13,505.1	4.167914 4.130499
Shep.....	48 59 07.098 109 21 41.046	70 41 51.9 110 37 38.4 125 47 11.3 356 15 55.1	250 32 58.2 290 31 25.4 305 39 24.4 176 16 06.9	Kirk..... Center XIII..... Todd..... Link.....	15,258.3 10,729.2 15,475.5 4,894.1	4.183505 4.030569 4.189645 3.689670
Ryder.....	49 02 20.175 109 21 36.200	0 56 47.3 77 50 31.6 103 42 16.0	180 56 43.5 257 44 14.7 283 34 25.2	Shep..... Center XIII..... Todd.....	5,965.3 10,372.5 13,022.9	3.775633 4.015884 4.114707
Forks (U. S. G. S.).....	48 49 09.958 109 21 28.775	155 04 11.9 180 07 11.1	334 57 48.6 0 07 12.1	Center XIII..... Link.....	24,510.4 13,562.7	4.389351 4.132345
318 (U. S. G. S.).....	49 00 00.367 109 16 39.400	16 16 06.1 75 00 37.8 97 34 08.8	196 12 29.5 254 56 50.1 277 24 08.0	Forks..... Shep..... Center XIII.....	20,926.7 6,349.2 16,312.5	4.320700 4.802717 4.212520
West Cherry (U. S. G. S.).....	48 52 35.306 108 57 44.012	77 48 48.5 120 52 17.8	257 30 57.2 300 38 01.7	Forks..... 318.....	29,692.7 26,887.4	4.472949 4.429549
Strong.....	49 04 50.177 109 09 21.080	44 53 01.2 327 56 45.6	224 47 30.2 148 05 31.5	318..... West Cherry.....	12,625.4 26,763.2	4.101245 4.427538
S-313.....	48 59 32.081 108 57 56.321	92 18 34.8 125 18 49.7 358 53 02.2	272 04 27.2 305 10 12.6 178 53 11.4	318..... Strong..... West Cherry.....	22,846.3 17,029.5 12,877.1	4.358816 4.231201 4.109819
Tubs.....	48 55 43.932 108 48 59.405	61 26 51.7 122 53 22.9	241 20 16.3 302 46 38.0	West Cherry..... S-313.....	12,169.6 12,998.5	4.085278 4.113895
Rounds.....	49 03 18.585 108 48 53.821	0 27 49.2 28 32 36.7 57 38 51.3	180 27 45.0 208 25 56.8 237 32 01.8	Tubs..... West Cherry..... S-313.....	14,045.4 22,609.4 13,055.2	4.147534 4.354289 4.115782
Center XIV.....	49 00 05.677 108 38 03.384	58 51 17.1 114 20 37.2	238 43 02.3 294 12 26.1	Tubs..... Rounds.....	15,602.3 14,495.0	4.193188 4.161219
Murray.....	48 58 05.664 108 35 33.383	75 08 13.3 120 48 22.5 140 34 24.6	254 58 05.5 300 38 18.3 320 32 31.4	Tubs..... Rounds..... Center XIV.....	16,974.6 18,921.6 4,800.7	4.229799 4.276958 3.681302
Telford.....	49 04 09.455 108 34 57.839	3 40 50.4 26 36 18.0 84 47 50.8	183 40 23.6 206 33 57.9 264 37 19.3	Murray..... Center XIV..... Rounds.....	11,261.3 8,421.1 17,043.7	4.051599 3.925370 4.231564
Avery.....	48 58 57.004 108 24 29.531	83 22 09.7 127 09 41.3	263 13 48.9 307 01 46.9	Murray..... Telford.....	13,593.1 16,003.0	4.133317 4.204201
Tees.....	49 03 09.731 108 23 44.810	6 38 36.9 56 57 25.9 97 45 39.6	186 38 03.1 236 48 31.0 277 37 11.1	Avery..... Murray..... Telford.....	7,859.8 17,192.3 13,787.4	3.895414 4.235335 4.139482
Harding.....	49 02 42.067 108 18 37.832	45 49 33.4 97 50 19.1	225 45 07.9 277 46 27.3	Avery..... Tees.....	9,970.6 6,291.9	3.998722 3.798780
Betts.....	48 58 10.402 108 18 20.662	100 54 09.9 144 34 07.3 177 37 14.7	280 49 31.5 324 30 02.6 357 37 01.7	Avery..... Tees..... Harding.....	7,638.2 11,353.2 8,399.4	3.882991 4.055117 3.924250
Raley.....	49 03 46.994 108 12 06.360	36 13 23.4 75 52 43.8	216 08 40.9 255 47 48.1	Betts..... Harding.....	12,882.6 8,197.7	4.110004 3.913690
White.....	48 57 27.530 108 12 03.160	99 49 30.7 140 29 54.3 179 40 56.8	279 44 45.9 320 24 56.4 359 40 54.4	Betts..... Harding..... Raley.....	7,702.1 12,600.1 11,722.4	3.891655 4.100374 4.069018
Cole.....	49 03 51.991 108 03 41.004	40 43 21.1 89 11 27.7	220 37 02.0 269 05 05.9	White..... Raley.....	15,658.5 10,200.0	4.194750 4.011147
Snow.....	48 55 49.567 108 02 20.987	104 23 27.3 141 09 52.7 173 46 46.9	284 16 08.2 321 02 30.8 353 45 46.5	White..... Raley..... Cole.....	12,227.0 18,950.2 14,991.4	4.087320 4.277613 4.175842
Cory.....	49 03 44.200 107 50 44.443	44 04 23.2 90 57 22.9	223 55 37.5 270 47 36.2	Snow..... Cole.....	20,382.8 15,760.3	4.309264 4.197730

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Kerr.....	48 59 16.478 107 50 39.821	65 56 08.2 118 17 11.2 179 21 00.1	245 47 19.3 298 07 21.2 359 20 56.6	Snow..... Cole..... Cory.....	15,630.3 18,008.3 8,270.9	4.193968 4.255473 3.917553
Center XV.....	49 00 00.742 107 47 06.328	72 32 05.0 147 19 43.6	252 29 23.9 327 16 58.8	Kerr..... Cory.....	4,550.3 8,202.6	3.658041 3.913950
Sowers.....	48 58 56.328 107 45 41.961	95 53 58.7 139 14 56.6 145 23 05.1	275 50 14.0 319 13 53.0 325 19 16.7	Kerr..... Center XV..... Cory.....	6,088.0 2,627.0 10,809.7	3.784478 3.419462 4.033815
Sowers N. W. base.....	48 59 38.781 107 48 49.910	72 52 29.6 252 07 49.8 288 55 21.7	252 51 06.7 72 09 08.0 108 57 43.5	Kerr..... Center XV..... Sowers.....	2,338.3 2,212.1 4,040.0	3.368893 3.344813 3.606377
Sowers S. E. base.....	48 58 40.967 107 48 20.803	111 13 31.2 161 40 11.1 211 33 32.5 261 37 31.6	291 11 46.3 341 39 49.1 31 34 28.7 81 39 31.4	Kerr..... Sowers N. W. base..... Center XV..... Sowers.....	3,032.1 1,881.47 2,892.4 3,264.6	3.481738 3.274497 3.461251 3.513829
Waters.....	49 04 08.499 107 43 53.214	12 54 53.2 27 09 19.6 84 54 16.9	192 53 31.1 207 06 53.7 264 49 06.2	Sowers..... Center XV..... Cory.....	9,893.3 8,600.3 8,381.4	3.995343 3.934513 3.923315
Dunbar.....	48 59 18.869 107 33 45.624	87 20 16.2 94 37 39.1 111 42 37.8 126 00 05.7	267 11 15.7 274 27 34.8 291 29 48.6 305 52 26.9	Sowers..... Center XV..... Cory..... Waters.....	14,581.3 16,328.4 22,261.9 15,244.6	4.163795 4.212943 4.347562 4.183116
Walsh.....	49 02 09.981 107 30 33.549	36 27 45.9 72 08 26.1 78 54 32.1 96 52 40.2	216 25 20.9 251 57 00.4 258 42 02.8 276 37 25.6	Dunbar..... Sowers..... Center XV..... Cory.....	6,570.8 19,406.2 20,563.3 24,760.2	3.817619 4.287940 4.313093 4.393754
Kennedy.....	48 55 40.297 107 21 29.540	114 20 52.6 137 28 37.6	294 11 37.4 317 21 47.1	Dunbar..... Walsh.....	16,426.1 16,348.4	4.215535 4.213475
French.....	49 00 48.847 107 20 44.709	5 28 08.4 80 08 57.2 101 53 40.9	185 27 34.6 259 59 07.8 281 46 16.3	Kennedy..... Dunbar..... Walsh.....	9,575.0 16,114.2 12,222.6	3.981140 4.207209 4.087165
Long.....	48 57 24.252 107 16 50.739	60 31 07.5 143 03 23.4	240 27 37.2 323 00 26.8	Kennedy..... French.....	6,519.3 7,910.5	3.814199 3.898203
Moulstead.....	49 00 10.457 107 13 11.648	40 58 16.4 50 33 40.0 97 23 12.3 194 39 14.3	220 55 31.1 230 27 24.4 277 17 30.3 14 41 42.2	Long..... Kennedy..... French..... Blum.....	6,797.7 13,122.9 9,283.5 15,688.5	3.832363 4.118029 3.967712 4.195581
Lewis.....	48 54 43.518 107 12 36.785	99 14 30.1 133 52 35.9 175 59 12.2	279 07 48.5 313 49 24.4 355 58 45.9	Kennedy..... Long..... Moulstead.....	10,987.1 7,167.2 10,124.4	4.040683 3.855350 4.005371
N. 286-A.....	49 00 03.789 107 08 44.973	25 30 36.3 92 12 16.2	205 27 41.5 272 08 54.9	Lewis..... Moulstead.....	10,960.1 5,424.2	4.039814 3.734337
Grave.....	48 55 56.017 107 07 40.773	69 38 38.0 139 27 51.4 170 19 30.6	249 34 54.9 319 23 41.8 350 18 42.2	Lewis..... Moulstead..... N. 286-A.....	6,428.9 10,347.5 7,764.6	3.808135 4.014834 3.890119
Alkali.....	49 00 35.294 107 01 44.531	40 03 40.1 83 32 46.8	219 59 11.3 263 27 29.4	Grave..... N. 286-A.....	11,266.0 8,600.2	4.051770 4.934511
Rabbit.....	48 58 13.550 106 59 14.673	67 37 55.4 106 25 36.8 145 11 09.7	247 31 33.6 286 18 26.4 325 09 16.6	Grave..... N. 286-A..... Alkali.....	11,139.1 12,065.0 5,334.3	4.046851 4.082247 3.727078
S. 282-A.....	48 59 52.439 106 53 06.356	67 50 49.9 97 13 08.2	247 46 12.0 277 06 37.1	Rabbit..... Alkali.....	8,067.9 10,614.6	3.907838 4.025902
Sage.....	49 01 53.244 106 52 06.138	18 09 36.7 52 07 14.8 78 28 50.0	196 08 51.2 232 01 51.2 258 21 33.3	S. 282-A..... Rabbit..... Alkali.....	3,927.4 11,042.2 11,995.8	3.594101 4.043054 4.079030
Creek.....	49 00 39.511 106 48 42.585	74 51 06.0 118 51 54.9	254 47 46.9 298 49 21.2	S. 282-A..... Sage.....	5,554.7 4,721.4	3.744660 3.674075
Hay.....	48 58 12.803 106 47 06.714	112 51 52.4 138 14 37.1 156 44 21.5	292 47 21.0 318 10 50.9 336 43 09.1	S. 282-A..... Sage..... Creek.....	7,933.8 9,133.1 4,933.4	3.899484 3.960618 3.693146
Rocky.....	49 01 56.907 106 46 03.481	10 31 25.9 53 31 45.1 65 56 14.3 89 09 29.0	190 30 38.2 233 29 45.0 245 50 55.2 269 04 55.2	Hay..... Creek..... S. 282-A..... Sage.....	7,041.2 4,020.7 9,413.9 7,367.6	3.847649 3.604300 3.973768 3.867325
S. 280.....	48 59 52.724 106 45 20.464	34 59 54.9 167 10 06.6	214 58 34.7 347 09 34.1	Hay..... Rocky.....	3,767.6 3,934.5	3.576068 3.594895
Rocky Creek north base.....	49 01 02.786 106 48 08.249	236 34 43.8 302 23 11.4	56 36 18.0 122 25 18.0	Rocky..... S. 280.....	3,036.5 4,038.8	3.482375 3.606250
Rocky Creek south base.....	48 59 55.282 106 47 39.355	164 16 33.1 207 23 48.5 271 35 18.5	344 16 11.3 27 25 00.9 91 37 03.3	Rocky Creek north base..... Rocky..... S. 280.....	2,166.43 4,232.2 2,824.3	3.335744 3.626571 3.450912

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Rocky Creek azimuth station.....	48 59 56.982 106 46 43.174	87 22 23.0 139 37 35.5 192 16 40.0 274 27 51.9	267 21 40.6 319 36 31.3 12 17 10.0 94 28 54.4	Rocky Creek south base..... Rocky Creek north base..... Rocky..... S. 280.....	1,143.2 2,668.6 3,791.5 1,686.3	3.058114 3.426291 3.578909 3.226947
Iron.....	48 59 04.689 106 41 27.487	76 57 17.3 107 25 12.0 133 30 54.4	256 53 01.4 287 22 16.3 313 27 26.1	Hay..... S. 280..... Rocky.....	7,062.0 4,963.4 7,730.7	3.850159 3.695775 3.888218
Smoky.....	49 01 20.689 106 38 52.868	36 48 46.7 60 00 59.2 71 00 24.0 97 20 00.7	216 46 50.0 239 54 46.5 250 55 31.5 277 14 35.6	Iron..... Hay..... S. 280..... Rocky.....	5,246.6 11,595.8 8,332.3 8,819.1	3.719676 4.064302 3.920764 3.945426
Cone.....	48 57 58.796 106 35 06.898	104 46 29.6 143 39 02.6	284 41 42.5 323 36 12.1	Iron..... Smoky.....	8,002.9 7,745.9	3.903248 3.89073
Burnt.....	49 00 40.094 106 32 42.625	30 29 57.3 74 36 45.3 99 30 09.8	210 28 08.4 254 30 09.2 279 25 30.3	Cone..... Iron..... Smoky.....	5,782.0 11,068.5 7,626.9	3.762077 4.044089 3.882350
Gravel.....	48 57 37.518 106 32 04.063	100 02 31.3 172 05 22.9	280 00 13.3 352 04 53.8	Cone..... Burnt.....	3,776.8 5,694.3	3.577118 3.755440
N. 276.....	49 00 01.319 106 31 04.597	15 14 00.5 52 29 33.1 121 01 31.4	195 13 15.6 232 26 30.1 301 00 17.4	Gravel..... Cone..... Burnt.....	4,603.9 6,212.8 2,324.7	3.663122 3.793284 3.366364
Mound.....	48 58 22.372 106 27 29.922	76 04 25.0 125 01 34.5	256 00 58.1 304 58 52.5	Gravel..... N. 276.....	5,745.5 5,328.5	3.759331 3.726609
Fox.....	48 59 11.922 106 26 32.001	37 34 58.0 105 25 27.1	217 34 14.3 285 22 01.4	Mound..... N. 276.....	1,931.4 5,747.8	3.285863 3.759503
Kld.....	48 57 19.428 106 25 05.874	93 48 07.5 123 35 03.5 153 15 30.9	273 42 51.9 303 33 14.8 333 14 25.9	Gravel..... Mound..... Fox.....	8,525.7 3,516.5 3,891.6	3.930729 3.546113 3.590130
Badger.....	49 00 17.762 106 19 21.174	51 52 12.6 76 58 15.2	231 47 52.5 256 52 50.0	Kld..... Fox.....	8,915.0 8,990.9	3.950123 3.953801
Branch.....	48 58 08.212 106 17 45.621	80 29 38.9 100 28 25.1 154 06 57.6	260 24 06.8 280 21 47.9 334 05 45.5	Kld..... Fox..... Badger.....	9,081.4 10,883.5 4,448.6	3.958151 4.036768 3.648225
Brace.....	49 01 25.775 106 14 16.917	34 49 35.3 71 15 45.0	214 46 57.8 251 11 55.3	Branch..... Badger.....	7,432.7 6,529.8	3.871148 3.814903
Coal.....	48 59 55.162 106 12 27.123	63 00 14.2 94 47 08.1 141 27 12.7	242 56 13.9 274 41 55.6 321 25 49.8	Branch..... Badger..... Brace.....	7,270.0 8,444.7 3,579.6	3.861536 3.926553 3.553837
Slim.....	49 02 40.772 106 09 58.674	30 32 13.0 66 11 52.3	210 30 20.9 246 08 37.3	Coal..... Brace.....	5,938.8 5,734.3	3.773699 3.758482
Jeff.....	49 01 21.876 106 09 49.624	50 05 21.6 91 17 54.9 175 41 14.9	230 03 22.7 271 14 33.1 355 41 08.1	Coal..... Brace..... Slim.....	4,173.7 5,431.8 2,444.1	3.620522 3.734947 3.388119
Windy.....	48 58 57.329 106 10 19.422	124 32 49.8 187 43 15.2	304 31 13.4 7 43 37.7	Coal..... Jeff.....	3,151.5 4,506.2	3.498513 3.653808
Kick.....	49 01 22.722 106 07 10.223	40 35 22.1 89 33 16.2 125 11 16.5	220 32 59.2 269 31 15.9 305 09 09.4	Windy..... Jeff..... Slim.....	5,912.7 3,238.6 4,185.8	3.771788 3.510363 3.621778
Noon.....	48 59 05.963 106 07 05.739	86 08 44.3 141 35 26.6 178 45 53.2	266 06 18.1 321 33 22.9 358 45 49.8	Windy..... Jeff..... Kick.....	3,947.1 5,359.4 4,225.7	3.596281 3.729113 3.625896
Bostick.....	48 58 02.184 106 03 18.203	113 05 17.4 142 44 25.3	293 02 25.8 322 41 30.2	Noon..... Kick.....	5,029.1 7,786.1	3.701494 3.891318
N. 268.....	49 00 18.179 106 02 35.535	11 40 18.6 67 55 26.8 109 41 09.1	191 39 46.4 247 52 02.9 289 37 41.7	Bostick..... Noon..... Kick.....	4,289.7 5,928.5 5,927.2	3.632429 4.772944 3.772849
N. 267.....	49 00 10.688 105 58 07.526	57 53 09.4 92 27 38.7	237 49 15.0 272 24 16.4	Bostick..... N. 268.....	7,480.6 5,452.1	3.872771 3.736564
Green.....	48 58 21.904 105 57 22.313	85 13 35.7 119 27 29.3 164 42 23.3	265 09 07.3 299 23 33.0 344 41 49.2	Bostick..... N. 268..... N. 267.....	7,263.8 7,311.2 3,484.0	3.861165 3.863999 3.542072
Black = Green north base.....	48 59 44.276 105 56 40.908	18 18 39.4 114 52 22.8	198 18 08.1 294 51 17.4	Green..... N. 267.....	2,680.2 1,940.5	3.428174 3.287910
Green south base.....	48 58 57.554 105 56 05.155	54 56 37.0 132 15 25.5 153 16 20.1	234 55 38.8 312 13 53.2 333 15 53.2	Green..... N. 267..... Black = Green north base.....	1,917.0 3,380.5 1,616.02	3.282613 3.526395 3.208446
Nick.....	48 58 46.941 105 53 17.046	81 12 40.4 113 09 34.5 113 41 17.0	261 09 35.3 293 07 00.7 293 37 37.8	Green..... Black = Green north base..... N. 267.....	5,047.3 4,507.3 6,447.2	3.703062 3.653920 3.806371

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Sod.....	49 00 16.313 105 53 02.434	6 08 33.8 77 27 34.1 88 25 37.2	186 08 22.7 257 24 49.2 268 21 46.9	Nick..... Black = Green north base..... N. 267.....	2,776.8 4,549.7 6,203.3	3.443537 3.657982 3.792624
Mud.....	48 59 55.787 105 50 15.082	60 07 29.9 100 34 35.9	240 05 12.6 280 32 29.6	Nick..... Sod.....	4,267.2 3,460.1	3.630140 3.539088
Child.....	48 57 19.106 105 46 12.593	107 29 31.8 123 20 32.0 134 29 29.8	287 24 11.6 303 15 22.8 314 26 26.9	Nick..... Sod..... Mud.....	9,049.5 9,970.9 6,909.6	3.956623 3.998735 3.839453
Lost.....	49 02 12.588 105 46 04.647	1 01 17.5 50 19 01.2 54 10 52.2 67 06 28.6	181 01 11.5 230 15 52.1 234 05 25.8 247 01 13.2	Child..... Mud..... Nick..... Sod.....	9,067.5 6,614.6 10,843.4 9,217.2	3.957489 3.820502 4.035164 3.964599
Harris.....	48 59 31.596 105 45 54.749	5 04 07.4 98 03 53.1 177 41 06.7	185 03 53.9 278 00 36.7 357 40 59.2	Child..... Mud..... Lost.....	4,108.9 5,344.6 4,977.3	3.613723 3.727911 3.696998
Middle.....	49 00 48.537 105 39 46.484	50 32 55.2 72 25 18.5 108 42 47.1	230 28 03.8 252 20 40.5 288 38 01.5	Child..... Harris..... Lost.....	10,172.9 7,853.3 8,109.6	4.007443 3.895052 3.909000
Fork.....	48 59 30.290 105 39 28.167	63 48 44.3 90 20 05.0 171 14 43.8	243 43 39.2 270 15 13.3 351 14 30.0	Child..... Harris..... Middle.....	9,169.0 7,859.1 2,445.7	3.962320 3.895374 3.388396
Scobey.....	48 59 32.871 105 36 15.775	88 51 08.9 118 38 50.2	268 48 43.6 298 36 11.1	Fork..... Middle.....	3,912.0 4,879.0	3.592402 3.688333
Poplar.....	49 01 20.756 105 35 10.112	21 49 44.3 56 58 35.4 79 58 43.2 186 55 39	201 48 54.7 236 55 20.5 259 55 14.5 6 55 39	Scobey..... Fork..... Middle..... Poplar (G. S. of C.).....	3,589.9 6,257.0 5,703.1 6.55	3.555087 3.796363 3.756110 0.8162
Break.....	48 59 30.956 105 35 11.704	92 36 32.6 180 32 47.5	272 35 44.2 0 32 48.7	Scobey..... Poplar.....	1,303.9 3,392.0	3.115228 3.530462
Knoll.....	49 01 17.150 105 33 56.370	25 01 37.0 41 20 47.6 94 15 35.3	205 00 40.1 221 19 02.3 274 14 39.6	Break..... Scobey..... Poplar.....	3,620.2 4,289.9 1,502.4	3.558732 3.632451 3.176775
Pole.....	48 58 56.270 105 31 38.536	103 54 33.7 147 14 38.2	283 51 52.8 327 12 54.2	Break..... Knoll.....	4,464.5 5,175.8	3.649771 3.713974
Din.....	49 00 48.940 105 31 13.475	63 34 23.1 104 46 02.8	243 31 23.3 284 43 59.9	Break..... Knoll.....	5,408.2 3,422.7	3.733053 3.534364
Coy.....	48 59 49.540 105 31 00.615	25 06 23.7 83 36 32.2 127 10 13.8 171 53 42.2	205 05 55.1 263 33 22.7 307 08 01.2 351 53 32.5	Pole..... Break..... Knoll..... Din.....	1,817.2 5,136.4 4,481.3 1,853.5	3.259414 3.710659 3.651404 3.267989
Nice.....	48 58 26.904 105 29 25.037	108 29 29.6 133 39 58.0 142 43 47.0 153 20 11.1	288 27 48.9 313 36 33.2 322 42 34.9 333 18 49.3	Pole..... Knoll..... Coy..... Din.....	2,862.3 7,620.9 3,208.3 4,910.3	3.456709 3.882007 3.506269 3.691111
Fee.....	49 01 09.605 105 25 19.783	44 47 34.3 84 57 40.1	224 44 29.2 264 53 13.1	Nice..... Din.....	7,079.2 7,215.1	3.849987 3.858243
Har.....	48 58 53.426 105 24 28.255	82 18 00.1 113 27 56.6 166 01 29.5	262 14 16.2 293 22 50.8 346 00 50.6	Nice..... Din..... Fee.....	6,090.5 8,976.7 4,335.2	3.784651 3.953116 3.637009
Ray = Ogden N. W. base.....	49 00 07.013 105 22 13.677	50 17 29.7 117 05 52.0	230 15 48.2 297 03 31.5	Har..... Fee.....	3,557.1 4,247.6	3.551094 3.628146
Fil.....	49 01 06.694 105 21 54.849	11 43 35.5 61 42 17.7 87 17 32.5 91 15 31.0	191 43 21.3 241 36 38.0 267 10 30.9 271 12 56.3	Ray = Ogden N. W. base..... Nice..... Din..... Fee.....	1,882.9 10,397.7 11,364.3 4,164.9	3.274830 4.016936 4.055542 3.619607
Ogden = Ogden S. E. base.....	48 59 19.906 105 21 31.696	77 10 53.6 80 23 42.1 103 09 16.7 149 36 57.0 171 53 03.4	257 08 40.4 260 17 45.0 283 01 57.7 329 36 25.3 351 52 45.9	Har..... Nice..... Din..... Ray = Ogden N. W. base..... Fil.....	3,681.8 9,763.0 12,140.7 1,686.96 3,332.2	3.566066 3.989585 4.084242 3.227106 3.522734
Neil.....	49 01 08.185 105 15 24.522	65 53 44.5 89 42 29.0	245 49 07.4 269 37 34.3	Ogden = Ogden S. E. base..... Fil.....	8,178.0 7,931.0	3.912647 3.896328
Merril.....	48 58 56.961 105 14 08.441	94 32 36.7 112 57 52.5 159 07 37.3	274 27 02.3 292 52 00.5 339 06 39.9	Ogden = Ogden S. E. base..... Fil..... Neil.....	9,040.1 10,292.5 4,338.7	3.956173 4.012520 3.637357
Hearst.....	48 59 12.737 105 10 08.440	84 19 19.7 119 04 09.7	264 16 18.6 299 00 11.1	Merril..... Neil.....	4,904.1 7,347.9	3.690556 3.866163
Spring.....	49 01 06.419 105 09 55.942	4 08 19.1 52 06 00.8 90 30 09.9	184 08 09.7 232 02 50.2 270 26 01.8	Hearst..... Merril..... Neil.....	3,521.0 6,506.4 6,676.5	3.546666 3.813343 3.824549

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Pull.....	49 00 17.594 105 07 04.325	61 51 29.1 113 24 20.4	241 49 10.1 293 22 10.8	Hearst..... Spring.....	4,245.2 3,799.7	3.627896 3.579747
Pebble.....	48 58 59.078 105 05 45.466	94 32 22.3 127 43 06.2 146 32 45.9	274 29 03.9 307 39 57.2 326 31 46.5	Hearst..... Spring..... Pull.....	5,363.5 6,433.8 2,907.4	3.729446 3.808469 3.463499
Fire.....	48 58 56.830 105 04 56.906	94 01 43.8 133 56 21.5	274 01 07.2 313 54 45.4	Pebble..... Pull.....	989.8 3,596.4	2.995559 3.555868
Beaver.....	48 58 47.313 105 02 32.607	95 44 12.2 116 49 01.6	275 42 23.3 296 45 36.6	Fire..... Pull.....	2,948.8 6,187.9	3.469652 3.791546
Mervin.....	49 01 59.671 105 02 27.282	1 02 38.2 28 18 43.2 35 50 54.8 60 46 19.5 79 48 59.2 189 19 25	181 02 34.2 208 16 50.3 215 48 25.2 240 42 50.4 259 43 20.5 9 19 25	Beaver..... Fire..... Pebble..... Pull..... Spring..... Mervin (G. S. of C.)	5,943.2 6,414.8 6,880.8 6,452.1 9,262.1 3.30	3.774022 3.807181 3.837637 3.809702 3.966708 0.5190
Robinson.....	48 58 56.269 104 56 01.269	88 03 00.1 125 52 38.1	267 58 04.8 305 47 46.8	Beaver..... Mervin.....	7,962.2 9,676.9	3.901035 3.985736
Pasture.....	49 01 58.646 104 55 38.825	4 37 51.8 54 56 32.1 90 15 41.5	184 37 34.8 234 51 19.7 270 10 33.1	Robinson..... Beaver..... Mervin.....	5,652.4 10,278.9 8,296.9	3.752231 4.011945 3.918917
Giles.....	49 02 13.060 104 50 30.650	47 53 46.1 85 57 48.3	227 49 36.5 265 53 55.6	Robinson..... Pasture.....	9,061.0 6,275.4	3.957174 3.797644
Zemper.....	48 59 50.317 104 47 20.080	81 06 00.3 111 24 58.7 138 43 56.9	260 59 27.0 291 18 42.2 318 41 33.0	Robinson..... Pasture..... Giles.....	10,726.7 10,862.3 5,868.5	4.030465 4.036720 3.768524
Look.....	49 00 21.752 104 47 03.075	19 35 36.3 129 12 45.9	199 35 23.5 309 10 09.2	Zemper..... Giles.....	1,030.8 5,441.5	3.013159 3.735717
Carlisle.....	49 02 20.149 104 46 33.154	9 26 23.2 87 25 32.4	189 26 00.6 267 22 33.1	Look..... Giles.....	3,707.7 4,828.7	3.569101 3.683827
Johnson.....	48 59 50.465 104 45 35.413	89 53 13.9 118 29 10.4 126 19 14.3 165 46 08.4	269 51 54.9 298 28 04.2 306 15 31.4 345 45 24.8	Zemper..... Look..... Giles..... Carlisle.....	2,127.6 2,027.0 7,442.6 4,770.5	3.327885 3.306857 3.871722 3.678565
Out.....	49 00 01.078 104 43 40.016	82 03 19.0 140 42 22.9	262 01 51.9 320 40 12.2	Johnson..... Carlisle.....	2,368.4 5,552.6	3.374456 3.744500
Lump.....	49 01 23.776 104 42 56.308	18 21 31.4 47 56 19.8 111 46 33.6	198 20 59.9 227 54 21.2 291 43 51.4	Out..... Johnson..... Carlisle.....	2,691.6 4,301.4 4,698.9	3.430011 3.633610 3.671994
Guard.....	48 59 58.130 104 39 59.921	91 11 21.4 126 08 31.9	271 06 35.2 306 06 17.2	Out..... Lump.....	4,474.6 4,487.9	3.650757 3.652044
Rose.....	49 02 03.044 104 39 39.968	5 59 59.0 52 20 25.8 73 15 55.6	185 59 43.9 232 17 24.5 253 13 25.8	Guard..... Out..... Lump.....	3,880.0 6,163.3 4,207.8	3.588836 3.789814 3.624056
Rood.....	49 02 09.442 104 37 36.580	35 41 35.6 85 30 12.4	215 39 47.4 265 28 39.2	Guard..... Rose.....	4,993.8 2,514.0	3.698428 3.400370
In.....	49 00 10.049 104 37 59.089	81 29 11.6 187 03 57.0	261 27 40.4 7 04 14.0	Guard..... Rood.....	2,483.4 3,716.5	3.395055 3.570135
Fly.....	49 00 09.892 104 35 40.680	86 04 57.2 90 06 48.7 125 44 19.3 147 29 20.1	266 01 41.6 270 05 04.3 305 41 18.7 327 27 52.6	Guard..... In..... Rose..... Rood.....	5,281.8 2,813.1 5,988.1 4,380.0	3.722778 3.449192 3.777289 3.641477
Berry.....	48 59 31.929 104 34 16.192	104 35 31.9 124 20 07.6 140 05 48.1	284 32 43.7 304 19 03.9 320 03 16.9	In..... Fly..... Rood.....	4,681.4 2,079.6 6,344.9	3.670373 3.317979 3.802422
Wild.....	49 01 22.868 104 33 30.014	15 19 08.6 49 40 52.6 67 39 55.1 106 03 08.0	195 18 33.7 229 39 13.9 247 36 32.0 286 00 01.8	Berry..... Fly..... In..... Rood.....	3,553.3 3,483.2 5,912.5 5,211.3	3.550627 3.541976 3.771769 3.716946
View.....	48 58 49.079 104 30 18.754	105 21 30.7 140 43 38.4	285 18 31.5 320 41 14.1	Berry..... Wild.....	5,005.7 6,138.6	3.699468 3.788071
Man.....	49 01 32.788 104 29 04.270	16 40 21.7 59 32 08.4 86 46 45.1	196 39 25.5 239 28 12.9 266 43 24.5	View..... Berry..... Wild.....	5,279.0 7,356.8 5,407.6	3.722550 3.866689 3.733006
White.....	49 00 35.243 104 25 31.962	60 40 14.3 112 25 05.2	240 36 37.9 292 22 24.9	View..... Man.....	6,689.1 4,065.8	3.825367 3.608926
Chap.....	48 58 26.072 104 25 19.340	96 41 21.2 141 37 17.0 176 19 18.4	276 37 35.3 321 34 27.3 356 19 08.9	View..... Man..... White.....	6,130.1 7,340.2 3,998.5	3.787466 3.866891 3.601901
Thompson.....	49 00 17.856 104 20 17.750	60 38 37.3 94 50 26.1	240 34 49.7 274 46 28.9	Chap..... White.....	7,037.0 6,408.3	3.847388 3.806746

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Blondie.....	48 58 06.528 104 19 30.077	94 23 58.6 121 40 18.4 166 22 04.7	274 19 35.1 301 35 45.4 346 21 28.8	Chap..... White..... Thompson.....	7,123.9 9,641.3 4,111.1	3.852717 3.936577 3.613953
High.....	49 00 36.380 104 15 41.488	45 31 14.2 84 12 32.9	225 28 21.7 264 09 04.4	Blondie..... Thompson.....	6,516.0 5,643.6	3.813983 3.751555
Round.....	48 59 10.973 104 15 05.903	70 16 29.4 106 05 05.0 164 40 19.8	250 13 10.1 288 01 09.7 344 39 52.9	Blondie..... Thompson..... High.....	5,707.9 6,667.4 2,735.7	3.756475 3.823957 3.437071
Cut.....	48 59 26.205 104 13 12.540	72 40 54.7 78 28 22.7 125 37 11.4	252 36 09.8 258 26 57.2 305 35 19.0	Blondie..... Round..... High.....	8,043.2 2,352.3 3,723.6	3.905431 3.371492 3.570664
Mon. 579.....	48 59 59.464 104 10 12.812	74 18 43.2 99 43 20.5	254 16 27.6 279 39 12.4	Cut..... High.....	3,795.2 6,776.7	3.579240 3.831018
Knute.....	48 57 27.450 104 10 03.617	96 20 37.4 117 30 51.7 130 23 06.6 133 41 44.9 177 43 14.6	276 13 30.1 297 27 03.7 310 18 51.7 313 39 22.4 357 43 07.7	Blondie..... Round..... High..... Cut..... Mon. 579.....	11,592.1 6,929.8 9,014.3 5,312.2 4,699.7	4.064161 3.840720 3.954932 3.725274 3.672066
Knute south base.....	48 57 35.098 104 09 03.364	79 05 48.1 162 26 10.6	250 05 02.6 342 25 18.2	Knute..... Mon. 579.....	1,248.3 4,677.9	3.096321 3.670054
Knute north base.....	48 58 18.800 104 08 54.911	7 15 29.6 41 23 15.6 153 00 59.3	187 15 23.2 221 22 23.8 333 00 00.6	Knute south base..... Knute..... Mon. 579.....	1,390.91 2,114.1 3,489.8	3.133829 3.325119 3.542801
Finley.....	48 58 05.327 104 05 25.141	78 21 31.0 121 06 43.3	258 18 00.9 301 03 06.2	Knute..... Mon. 579.....	5,784.1 6,829.7	3.762238 3.834399
Deal.....	49 00 31.250 104 04 08.622	19 02 54.4 51 50 54.1 82 28 54.3	199 01 56.7 231 46 26.2 262 24 19.4	Finley..... Knute..... Mon. 579.....	4,768.7 9,183.6 7,466.8	3.678400 3.963015 3.873135
Fine.....	48 57 34.317 103 58 03.532	96 08 00.1 126 24 06.9	276 02 27.0 306 19 33.4	Finley..... Deal.....	9,033.7 9,218.4	3.955864 3.964654
Foster.....	49 00 19.081 103 57 05.271	13 06 30.0 67 55 40.7 92 32 46.3	193 05 46.0 247 49 23.6 272 27 26.7	Fine..... Finley..... Deal.....	5,225.8 10,971.0 8,612.1	3.719156 4.040245 3.935109
Flew.....	49 00 01.113 103 51 08.759	61 46 41.3 94 25 03.9	241 41 28.3 274 20 34.8	Fine..... Foster.....	9,575.9 7,267.4	3.981181 3.861376
Skermo.....	48 57 29.830 103 47 38.223	90 41 23.2 114 27 06.0 137 31 48.0	270 33 31.6 294 19 58.2 317 29 09.2	Fine..... Foster..... Flew.....	12,721.3 12,660.1 6,337.9	4.104532 4.102439 3.801942
Fled.....	49 00 06.116 103 46 14.644	19 24 07.8 72 03 13.3 88 32 59.1 91 48 10.5	199 23 04.7 251 54 18.5 268 29 17.1 271 39 59.4	Skermo..... Fine..... Flew..... Foster.....	5,118.3 15,158.2 5,980.1 13,229.8	3.709128 4.180647 3.776710 4.121555
Bowie (U. S. C. & G. S.).....	48 59 55.870 103 44 00.917	44 25 45.8 96 39 21.8	224 23 01.8 276 37 40.9	Skermo..... Fled.....	6,315.0 2,736.5	3.800375 3.437188
Olsen.....	49 00 14.878 103 41 56.038	53 48 09.9 76 59 14.1	233 43 51.7 256 57 39.9	Skermo..... Bowie.....	8,626.0 2,605.2	3.935810 3.415848
Brown.....	48 57 38.745 103 41 36.608	87 53 37.3 128 52 19.1 145 18 11.8 175 19 08.7	267 49 04.6 308 48 49.3 325 16 22.9 355 18 54.0	Skermo..... Fled..... Bowie..... Olsen.....	7,361.4 7,258.6 5,153.1 4,839.3	3.866958 3.860853 3.712068 3.684786
Ruin.....	48 58 39.275 103 38 30.681	63 42 31.3 109 26 53.4 125 17 50.7	243 40 11.1 289 22 44.2 305 15 15.7	Brown..... Bowie..... Olsen.....	4,218.5 7,118.7 5,113.9	3.625162 3.852403 3.708753
Gopher.....	48 59 57.717 103 38 21.804	4 15 37.6 42 43 06.4 96 57 51.7	184 15 30.9 222 40 39.6 276 55 10.1	Ruin..... Brown..... Olsen.....	2,429.9 5,841.3 4,386.6	3.385587 3.766511 3.642126
Hagen.....	49 00 29.323 103 33 51.808	59 04 48.3 79 56 21.8	239 01 17.9 259 52 58.1	Ruin..... Gopher.....	6,610.4 5,573.7	3.820227 3.746147
Ledge.....	48 58 52.704 103 33 49.600	85 52 42.5 109 58 31.0 179 08 18.9	265 49 10.4 289 55 05.6 359 08 17.2	Ruin..... Gopher..... Hagen.....	5,730.7 5,887.1 2,985.1	3.758206 3.769901 3.474957
Custom.....	49 00 23.305 103 30 33.237	54 59 04.2 92 39 30.6	234 56 36.0 272 37 00.7	Ledge..... Hagen.....	4,875.2 4,039.9	3.687995 3.606369
Ambrose.....	48 58 45.403 103 30 05.753	92 51 35.1 124 57 39.5 169 32 09.2	272 48 46.2 304 54 45.9 349 31 48.5	Ledge..... Hagen..... Custom.....	4,557.3 5,605.7 3,075.5	3.658711 3.748628 3.487918
School=Ambrose N. E. base (U. S. C. & G. S.)	48 59 23.575 103 29 10.462	43 38 19.0 80 29 28.6 93 14 52.6 109 34 56.6 137 38 51.9	223 37 37.3 260 25 56.6 273 03 40.6 289 31 24.3 317 37 49.5	Ambrose..... Ledge..... Bowie..... Hagen..... Custom.....	1,629.2 5,755.0 18,129.0 6,068.8 2,497.1	3.211973 3.760046 4.258374 3.783101 3.397441



## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Jasper.....	48 53 27.049 103 39 28.411	155 14 51.3 186 56 22.7 214 23 35.9 228 43 25.6	335 11 25.8 6 57 06.1 34 27 51.3 48 51 11.6	Bowie..... Ruin..... Ledge..... School=Ambrose N. E. base..	13,229.4 9,716.3 12,196.2 16,716.5	4.121539 3.987501 4.086226 4.223145
Ambrose S. W. base (U. S. C. & G. S.)..	48 57 06.622 103 37 01.856	121 34 23.2 246 08 22.3	301 29 07.0 66 14 17.9	Bowie..... School=Ambrose N. E. base..	9,998.1 10,479.18	3.999917 4.020327
Bilby.....	48 54 46.831 103 32 51.582	73 04 57.5 125 06 13.4 130 18 54.6 136 10 34.1 171 10 16.7 207 43 56.3	252 59 58.6 304 57 48.6 310 15 46.0 316 06 18.4 351 09 33.0 27 46 43.1	Jasper..... Bowie..... Ambrose S. W. base..... Ruin..... Ledge..... School=Ambrose N. E. base..	8,449.2 16,630.1 6,678.1 9,958.5 7,686.5 9,660.5	3.926818 4.220895 3.824650 3.998192 3.885729 3.984999
Nat.....	48 59 05.500 103 27 51.099	77 14 19.5 109 05 46.4	257 12 37.9 289 04 46.5	Ambrose..... School=Ambrose N. E. base..	2,807.5 1,707.4	3.448316 3.232341
Ambrose west base.....	48 57 21.912 103 29 31.965	165 05 01.2 212 39 08.0	345 04 35.7 32 40 24.1	Ambrose..... Nat.....	2,669.2 3,801.1	3.426374 3.579907
Ambrose east base.....	48 57 28.106 103 27 46.950	84 53 35.0 130 14 22.2 178 23 37.2	264 52 15.8 310 12 37.5 358 23 34.1	Ambrose west base..... Ambrose..... Nat.....	2,144.95 3,697.5 3,009.8	3.331417 3.567911 3.478541
Friess.....	49 00 52.835 103 27 10.121	14 06 20.1 41 35 15.0 77 33 33.4	194 05 49.2 221 33 44.2 257 31 00.1	Nat..... School=Ambrose N. E. base.. Custom.....	3,418.8 3,685.9 4,227.3	3.533869 3.566544 3.626063
Wheat.....	49 00 36.063 103 25 00.697	51 04 53.3 101 08 17.5	231 02 44.7 281 06 39.9	Nat..... Friess.....	4,453.1 2,680.4	3.648661 3.428202
Gubert.....	48 59 17.367 103 24 36.555	84 43 30.3 133 23 29.3 168 35 41.2	264 41 03.5 313 21 33.5 348 35 23.0	Nat..... Friess..... Wheat.....	3,972.4 4,294.2 2,481.0	3.599048 3.632881 3.394624
Bone.....	48 59 40.017 103 22 28.402	74 58 50.9 119 14 54.8	254 57 14.2 299 12 59.9	Gubert..... Wheat.....	2,697.6 3,547.2	3.430983 3.549884
Lister.....	49 00 46.788 103 20 14.488	52 51 28.2 62 37 02.1 86 46 44.0	232 49 47.2 242 33 44.3 266 43 06.0	Bone..... Gubert..... Wheat.....	3,415.1 6,000.4 5,825.6	3.533400 3.778183 3.765340
Huso.....	48 58 42.626 103 19 59.050	100 47 53.4 120 17 38.2 175 19 28.8	280 44 23.9 300 15 45.5 355 19 17.1	Gubert..... Bone..... Lister.....	5,743.6 3,516.2 3,848.4	3.759188 3.546078 3.585277
Hold.....	49 00 48.051 103 16 40.658	46 10 04.8 89 30 28.6	226 07 35.1 269 27 47.2	Huso..... Lister.....	5,592.6 4,345.4	3.747612 3.639029
Bloom.....	48 59 09.652 103 16 31.791	78 48 58.6 123 33 49.6 176 36 29.7	258 46 22.2 303 31 01.5 356 36 23.0	Huso..... Lister..... Hold.....	4,296.2 5,430.9 3,045.0	3.633064 3.734969 3.483594
Church.....	48 59 00.456 103 14 35.965	96 53 22.3 142 41 06.1	276 51 54.9 322 39 32.0	Bloom..... Hold.....	2,372.1 4,179.9	3.375133 3.621165
Good.....	49 00 15.270 103 12 38.871	45 51 29.2 66 50 52.6 101 40 12.4	225 50 00.8 246 47 56.7 281 37 09.9	Church..... Bloom..... Hold.....	3,317.7 5,150.5 5,017.0	3.520842 3.711851 3.700443
Mouse.....	48 58 54.071 103 11 56.826	93 30 17.1 121 25 28.5 161 11 16.4	273 28 17.0 301 21 54.3 341 10 44.7	Church..... Hold..... Good.....	3,241.8 6,759.0 2,650.0	3.510788 3.829883 3.423241
Bacon.....	48 59 11.546 103 07 29.468	84 21 26.2 107 24 42.7	264 18 04.4 287 20 49.2	Mouse..... Good.....	5,462.8 6,590.4	3.737419 3.818914
Hansen.....	49 00 27.764 103 06 47.543	19 54 08.7 65 18 49.1 86 56 34.1	199 53 37.1 245 14 55.7 266 52 09.0	Bacon..... Mouse..... Good.....	2,504.0 6,921.4 7,150.7	3.398634 3.840196 3.854350
Feeney.....	48 59 01.477 103 03 50.508	94 01 10.1 126 32 43.2	273 58 24.9 306 30 29.6	Bacon..... Hansen.....	4,462.8 4,478.4	3.649008 3.651124
Burner.....	49 00 33.419 103 03 34.010	6 44 08.6 62 10 15.8 87 28 38.3	186 43 56.2 242 07 18.2 267 26 12.3	Feeney..... Bacon..... Hansen.....	2,800.0 5,413.3 3,937.0	3.456359 3.733465 3.595165
Just.....	49 00 09.297 103 00 37.125	61 57 58.6 101 43 42.4	241 55 32.7 281 41 28.9	Feeney..... Burner.....	4,454.8 3,671.4	3.648823 3.564837
Plow.....	48 58 38.604 102 59 34.867	97 46 01.2 126 08 16.1 155 41 38.6	277 42 48.3 306 05 15.5 335 40 51.6	Feeney..... Burner..... Just.....	5,246.1 6,017.8 3,074.3	3.719835 3.779441 3.487743
Ross.....	49 00 00.876 102 55 36.265	62 22 26.1 92 28 01.6	242 19 26.1 272 24 14.6	Plow..... Just.....	5,476.4 6,120.7	3.738496 3.786900
Corn.....	48 58 12.489 102 55 24.251	99 01 14.1 119 35 46.9 175 49 42.5	278 58 05.0 299 31 50.8 355 49 33.4	Plow..... Just..... Ross.....	5,160.2 7,313.4 3,357.2	3.712666 3.864120 3.525971
Ross west base.....	48 58 52.744 102 56 35.305	209 41 21.4 310 42 27.8	29 42 05.9 130 43 21.4	Ross..... Corn.....	2,422.9 1,906.4	3.384338 3.280213

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	"	°	'	"	°	'	"			
Ross east base.....	48	58	52.623	13	34	11.8	193	34	00.7	Corn.....	1,275.4	3.105644
	102	55	09.538	90	07	55.2	270	06	50.4	Ross west base.....	1,744.00	3.241547
				165	33	04.8	345	32	44.6	Ross.....	2,177.4	3.337929
Crosby 2.....	48	58	01.333	94	34	23.2	274	31	42.6	Corn.....	4,343.5	3.637840
	102	51	51.368	128	56	49.4	308	53	59.7	Ross.....	5,877.7	3.769210
Estevan.....	49	00	13.774	10	43	54.4	190	43	25.6	Crosby 2.....	4,164.0	3.619516
	102	51	13.247	53	44	30.0	233	41	20.6	Corn.....	6,331.0	3.801470
				85	45	56.3	265	42	37.8	Ross.....	5,360.8	3.729229
Center I.....	48	59	15.177	61	32	54.8	241	30	18.7	Crosby 2.....	4,784.8	3.679862
	102	48	24.536	117	50	36.1	297	48	28.8	Estevan.....	3,877.9	3.588599
Percee.....	49	00	55.298	59	10	34.4	239	07	22.1	Center I.....	6,031.5	3.780422
	102	44	09.780	60	14	57.4	286	03	09.1	Crosby 2.....	10,813.8	4.033980
				81	33	58.7	261	28	39.1	Estevan.....	8,700.9	3.939562
Columbus.....	48	58	25.209	85	38	16.5	265	32	21.9	Crosby 2.....	9,589.2	3.981780
	102	44	01.282	106	06	45.7	286	03	27.1	Center I.....	5,571.1	3.745944
				177	52	00.3	357	51	53.9	Percee.....	4,639.7	3.666491
Center II.....	48	59	52.750	28	48	41.9	208	47	46.7	Columbus.....	3,086.1	3.489412
	102	42	48.148	139	21	29.8	319	20	28.2	Percee.....	2,546.7	3.405985
Dunbar.....	49	00	33.857	52	56	45.8	232	53	30.6	Columbus.....	6,591.3	3.818972
	102	39	42.623	71	24	25.3	251	22	05.3	Center II.....	3,978.9	3.599758
				96	59	00.3	276	55	38.6	Percee.....	5,469.2	3.737924
Rival.....	48	58	27.426	89	24	59.7	269	21	03.3	Columbus.....	6,371.6	3.804249
	102	38	47.995	118	23	08.3	298	20	07.1	Center II.....	5,548.8	3.744195
				164	07	58.0	344	07	16.8	Dunbar.....	4,060.5	3.608578
Center III.....	48	59	56.359	45	59	57.2	225	58	11.7	Rival.....	3,954.0	3.597034
	102	36	28.139	106	21	06.5	286	18	39.7	Dunbar.....	4,119.0	3.614791
Grey.....	48	58	51.830	80	48	27.9	260	45	35.5	Rival.....	4,707.7	3.672806
	102	34	59.482	118	44	00.4	298	40	26.8	Dunbar.....	6,562.2	3.817046
				137	53	24.0	317	52	17.1	Center III.....	2,687.5	3.429347
Pinto.....	49	00	55.090	12	39	30.6	192	38	58.8	Grey.....	3,902.4	3.591328
	102	34	17.426	55	41	05.0	235	39	26.3	Center III.....	3,216.9	3.507434
				84	21	57.3	264	17	51.8	Dunbar.....	6,640.9	3.822226
Center IV.....	48	59	44.541	76	52	02.9	256	47	44.6	Grey.....	7,147.5	3.854156
	102	29	17.166	109	41	01.6	289	37	15.0	Pinto.....	6,479.9	3.811569
South Portal.....	48	58	06.895	99	56	42.3	279	51	47.4	Grey.....	8,070.3	3.906890
	102	28	28.556	126	15	43.8	306	11	20.6	Pinto.....	8,791.8	3.944079
				161	51	44.5	341	51	07.8	Center IV.....	3,174.2	3.501636
Portal north base.....	48	59	18.036	255	49	20.9	75	51	21.3	Center IV.....	3,346.8	3.524624
	102	31	56.790	297	24	26.1	117	27	03.2	South Portal.....	4,770.7	3.678585
Portal south base.....	48	58	03.643	134	43	07.2	314	41	41.1	Portal north base.....	3,266.80	3.514122
	102	30	02.614	196	30	35.9	16	31	10.2	Center IV.....	3,251.0	3.512016
				266	59	01.0	87	00	12.0	South Portal.....	1,915.7	3.282328
North Portal.....	49	00	30.763	6	14	11.0	186	13	53.0	South Portal.....	4,470.7	3.650378
	102	28	04.678	45	54	18.1	225	53	23.4	Center IV.....	2,051.7	3.312121
				95	42	14.4	275	37	33.1	Pinto.....	7,611.9	3.881493
Center V.....	48	59	43.963	43	20	00.2	223	18	15.3	South Portal.....	4,121.5	3.615051
	102	26	09.497	121	42	33.4	301	41	06.5	North Portal.....	2,751.5	3.439573
Klitzke.....	48	58	09.586	89	04	48.7	269	01	41.9	South Portal.....	5,035.8	3.702072
	102	24	20.992	133	49	26.8	313	46	38.0	North Portal.....	6,300.9	3.799402
				142	53	40.9	322	52	19.0	Center V.....	3,656.1	3.563023
Bien.....	49	00	25.968	17	34	33.4	197	33	43.9	Klitzke.....	4,419.2	3.645344
	102	23	15.380	69	52	56.1	249	50	44.7	Center V.....	3,769.4	3.576276
				91	28	24.2	271	24	45.9	North Portal.....	5,881.3	3.769471
Spy.....	49	01	01.821	58	21	25.2	238	16	05.3	Klitzke.....	10,129.1	4.005571
	102	17	17.009	81	23	22.9	261	18	52.4	Bien.....	7,366.3	3.867248
Flax.....	48	57	58.355	92	08	47.1	272	02	55.9	Klitzke.....	9,477.6	3.976697
	102	16	35.330	119	19	05.7	299	14	03.8	Bien.....	9,324.7	3.969633
				171	30	05.4	351	29	33.9	Spy.....	5,730.6	3.758197
Minot.....	48	58	50.577	80	52	30.8	260	46	20.4	Flax.....	10,116.5	4.005029
	102	08	24.251	110	34	52.0	290	28	10.0	Spy.....	11,563.1	4.063076
Lake.....	49	02	10.004	1	30	13.2	181	30	07.2	Minot.....	6,162.7	3.789772
	102	08	16.299	52	35	06.3	232	28	49.8	Flax.....	12,779.5	4.106514
				79	12	07.3	259	05	19.1	Spy.....	11,184.8	4.048627
Pleasant.....	48	58	07.092	110	36	07.3	290	33	54.6	Minot.....	3,820.8	3.582160
	102	05	28.366	155	33	29.6	335	31	22.9	Lake.....	8,243.7	3.916124
Oxbow.....	49	01	42.632	9	17	28.9	189	16	48.5	Pleasant.....	6,746.8	3.829097
	102	04	34.807	41	17	12.8	221	14	19.7	Minot.....	7,070.8	3.849469
				100	39	59.5	280	37	12.3	Lake.....	4,577.9	3.660669

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	"	°	'	"	°	'	"			
Center VI .....	48 59	42.335		43 46	20.1		223 44	35.5		Pleasant .....	4, 073. 6	3. 609973
	102 03	09. 810		155 04	48. 4		335 03	44. 2		Oxbow .....	4, 098. 0	3. 612569
Sherwood .....	48 57	52. 984		95 23	32. 2		275 20	40. 2		Pleasant .....	4, 657. 9	3. 668190
	102 01	40. 365		151 42	36. 0		331 41	28. 5		Center VI .....	3, 836. 5	3. 583939
Souris .....	49 01	24. 309		13 00	39. 6		192 59	43. 6		Sherwood .....	6, 699. 9	3. 826071
	102 00	26. 206		46 33	44. 9		226 31	41. 4		Center VI .....	4, 580. 2	3. 660890
				96 25	15. 0		276 22	07. 2		Oxbow .....	5, 082. 1	3. 706042
Glen .....	49 01	29. 902		50 25	39. 8		230 20	39. 2		Sherwood .....	10, 509. 4	4. 021578
	101 55	02. 102		88 31	50. 7		268 27	16. 0		Souris .....	6, 586. 9	3. 818640
School .....	48 57	57. 502		89 05	22. 7		269 00	11. 6		Sherwood .....	8, 388. 0	3. 923658
	101 54	48. 038		132 56	14. 9		312 51	59. 7		Souris .....	9, 384. 6	3. 972416
				177 30	23. 9		357 30	13. 3		Glen .....	6, 567. 6	3. 817404
Center VII .....	48 59	21. 785		39 07	39. 0		219 07	20. 4		School .....	3, 355. 8	3. 525796
	101 53	03. 925		148 45	39. 0		328 44	09. 8		Glen .....	4, 629. 4	3. 665529
Cornduff .....	49 01	42. 518		28 14	53. 4		208 13	26. 7		Center VII .....	4, 934. 7	3. 693258
	101 51	09. 047		85 19	05. 7		265 16	09. 7		Glen .....	4, 750. 6	3. 676749
Morse .....	48 58	04. 211		87 35	14. 5		267 32	13. 7		School .....	4, 873. 6	3. 687852
	101 50	48. 642		131 04	24. 2		311 02	42. 1		Center VII .....	3, 648. 3	3. 562091
				176 28	58. 7		356 28	43. 3		Cornduff .....	6, 756. 6	3. 829725
Center VIII .....	49 00	00. 181		51 23	44. 2		231 20	57. 8		Morse .....	5, 738. 8	3. 758823
	101 47	08. 147		122 52	47. 5		302 49	45. 6		Cornduff .....	5, 827. 2	3. 765462
Nelson .....	48 57	38. 979		96 45	06. 6		276 41	01. 2		Morse .....	6, 663. 1	3. 823674
	101 45	23. 317		153 58	01. 6		333 56	42. 5		Center VIII .....	4, 854. 9	3. 686180
Morse west base .....	48 57	57. 093		96 57	26. 5		276 56	19. 6		Morse .....	1, 817. 5	3. 259481
	101 49	19. 940		215 09	40. 0		35 11	19. 5		Center VIII .....	4, 651. 8	3. 667620
Morse east base .....	48 57	57. 181		89 56	13. 4		269 54	55. 7		Morse west base .....	2, 096. 37	3. 321467
	101 47	36. 874		93 12	24. 6		273 10	00. 0		Morse .....	3, 906. 5	3. 591793
				188 44	12. 1		8 44	33. 9		Center VIII .....	3, 844. 3	3. 584818
Lyll .....	49 01	43. 370		0 32	49. 3		180 32	46. 6		Nelson .....	7, 550. 0	3. 877946
	101 45	19. 773		34 38	56. 1		214 37	34. 3		Center VIII .....	3, 874. 4	3. 588205
				89 49	24. 6		269 45	00. 9		Cornduff .....	7, 095. 3	3. 850973
Coutts .....	48 57	57. 159		85 16	49. 8		265 12	39. 4		Nelson .....	6, 775. 8	3. 830963
	101 39	51. 352		136 20	34. 9		316 16	27. 1		Lyll .....	9, 664. 4	3. 985175
Fife .....	49 01	44. 045		3 18	17. 8		183 18	02. 8		Coutts .....	7, 020. 6	3. 846372
	101 39	31. 454		43 24	42. 2		223 20	16. 7		Nelson .....	10, 415. 1	4. 017664
				89 52	03. 5		269 47	40. 6		Lyll .....	7, 076. 0	3. 849785
Center IX .....	49 00	49. 885		39 33	39. 8		219 30	56. 4		Coutts .....	6, 918. 8	3. 840032
	101 36	14. 706		112 43	56. 2		292 41	27. 7		Fife .....	4, 333. 4	3. 639833
Winter .....	49 02	14. 009		27 03	41. 1		207 02	51. 8		Center IX .....	2, 918. 1	3. 465099
	101 35	09. 376		35 52	16. 3		215 48	43. 4		Coutts .....	9, 788. 0	3. 990596
				80 09	48. 5		280 06	30. 6		Fife .....	5, 403. 4	3. 732609
Simmons .....	48 58	33. 091		80 36	05. 3		260 31	57. 5		Coutts .....	6, 772. 8	3. 830767
	101 34	22. 846		133 16	26. 3		313 12	33. 4		Fife .....	8, 610. 6	3. 935031
				151 43	35. 6		331 42	11. 2		Center IX .....	4, 798. 7	3. 681128
				172 06	57. 5		352 06	22. 4		Winter .....	6, 889. 8	3. 838204
Cowan .....	49 01	42. 086		46 52	14. 3		226 48	23. 1		Simmons .....	8, 535. 0	3. 931203
	101 29	16. 547		97 52	17. 0		277 47	50. 6		Winter .....	7, 234. 5	3. 859409
Mohall .....	48 57	57. 448		99 31	18. 0		279 27	13. 6		Simmons .....	6, 679. 6	3. 824752
	101 28	58. 909		136 30	19. 0		316 25	39. 4		Winter .....	10, 832. 3	4. 035711
				177 02	40. 1		357 02	26. 8		Cowan .....	6, 948. 7	3. 841905
Holly .....	48 57	47. 715		92 43	16. 9		272 39	19. 5		Mohall .....	6, 409. 3	3. 809811
	101 23	44. 157		137 00	44. 9		316 56	34. 1		Cowan .....	9, 903. 2	3. 995774
Winlaw .....	49 02	08. 275		0 49	52. 9		180 49	48. 6		Holly .....	8, 050. 0	3. 905796
	101 23	38. 417		40 05	16. 7		220 01	14. 9		Mohall .....	10, 123. 0	4. 005311
				83 19	02. 3		263 14	47. 1		Cowan .....	6, 916. 0	3. 839855
Bake .....	48 58	53. 519		72 00	08. 4		251 56	16. 8		Holly .....	6, 567. 8	3. 817423
	101 18	37. 072		134 31	22. 4		314 27	35. 0		Winlaw .....	8, 584. 9	3. 933736
Fry .....	49 01	06. 861		4 57	23. 6		184 57	10. 3		Bake .....	4, 134. 6	3. 616433
	101 18	19. 504		47 02	49. 3		226 58	44. 3		Holly .....	9, 022. 7	3. 953336
				106 21	18. 6		286 17	17. 8		Winlaw .....	6, 750. 8	3. 829356
Center X .....	48 59	49. 155		69 57	39. 0		249 54	44. 3		Bake .....	5, 009. 8	3. 699824
	101 14	45. 007		118 55	48. 8		298 53	07. 4		Fry .....	4, 965. 8	3. 695987
Audry .....	48 58	10. 298		101 08	15. 6		281 04	03. 1		Bake .....	6, 933. 5	3. 840954
	101 13	02. 508		145 32	34. 8		325 31	17. 0		Center X .....	3, 704. 1	3. 568986
Cantel .....	49 01	53. 074		1 54	52. 6		181 54	44. 0		Audry .....	6, 885. 8	3. 837954
	101 12	51. 197		31 16	59. 0		211 15	32. 6		Center X .....	4, 478. 8	3. 651159
				77 57	10. 9		257 53	03. 0		Fry .....	6, 821. 0	3. 833846

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Center XI.....	48 59 58.596 101 10 29.249	42 58 57.6 140 48 48.8	222 57 02.0 320 47 01.7	Audry..... Cantel.....	4,572.0 4,563.5	3.660104 3.659300
Antler.....	48 58 07.992 101 09 12.111	90 53 38.7 155 21 03.6	270 50 44.9 335 20 05.4	Audry..... Center XI.....	4,686.5 3,759.5	3.670849 3.575128
Copley.....	49 01 47.499 101 08 55.113	2 55 07.5 29 37 54.7 92 04 50.7	182 54 54.6 209 36 43.6 272 01 52.5	Antler..... Center XI..... Cantel.....	6,789.7 3,870.0 4,798.8	3.831853 3.587715 3.681135
Center XII.....	49 00 08.719 101 06 40.423	39 36 19.0 138 07 31.3	219 34 24.5 318 05 49.6	Antler..... Copley.....	4,839.5 4,099.0	3.684802 3.612677
Elva.....	49 01 45.496 101 04 56.118	35 20 42.8 90 45 19.0	215 19 24.1 270 42 18.6	Center XII..... Copley.....	3,664.6 4,855.3	3.564031 3.686220
Lock.....	48 58 40.055 101 04 52.820	79 23 20.6 141 23 49.2 179 19 46.0	259 20 04.9 321 22 28.0 359 19 43.5	Antler..... Center XII..... Elva.....	5,365.5 3,505.4 5,729.0	3.729607 3.544736 3.759076
Center XIII.....	49 00 38.494 101 02 54.168	33 24 23.2 129 53 06.9	213 22 53.7 309 51 34.9	Lock..... Elva.....	4,382.3 3,228.5	3.641704 3.509005
Holt.....	48 58 23.303 101 01 36.988	97 25 21.3 159 24 59.3	277 22 53.6 339 24 01.1	Lock..... Center XIII.....	4,015.9 4,461.2	3.603784 3.649453
Manor.....	49 01 27.244 101 01 31.057	1 12 57.4 48 16 53.9 97 43 39.9	181 12 52.9 228 15 51.2 277 41 05.1	Holt..... Center XIII..... Elva.....	5,683.5 2,262.7 4,203.9	3.754617 3.354633 3.623648
Hope.....	48 58 10.823 100 54 49.749	92 42 27.0 126 41 04.2	272 37 19.8 306 36 01.4	Holt..... Manor.....	8,291.3 10,166.8	3.918623 4.007183
Smart.....	49 02 25.985 100 53 28.318	11 51 58.7 53 00 12.3 79 33 58.7	191 50 57.2 232 54 03.4 259 27 54.2	Hope..... Holt..... Manor.....	8,054.2 12,443.3 9,972.4	3.906024 4.094936 3.998798
Center XV.....	48 59 45.698 100 52 32.979	43 30 41.5 167 12 41.5	223 28 58.3 347 11 59.8	Hope..... Smart.....	4,040.2 5,077.6	3.606408 3.705659
Sween.....	48 58 04.044 100 50 04.058	92 05 39.0 136 03 26.9	272 02 03.5 316 01 34.6	Hope..... Center XV.....	5,814.4 4,362.4	3.764507 3.639726
Smith.....	49 01 46.291 100 49 29.526	5 50 27.8 44 23 35.1 45 02 21.8 104 12 46.3	185 50 01.7 224 19 33.4 225 00 03.3 284 09 46.0	Sween..... Hope..... Center XV..... Smart.....	6,901.4 9,309.7 5,270.2 5,002.9	3.838935 3.968936 3.721830 3.699225
Center XVI.....	48 59 54.902 100 46 43.990	49 55 44.7 135 40 03.4	229 53 13.7 315 37 58.4	Sween..... Smith.....	5,317.5 4,812.0	3.725710 3.682326
Mouse.....	48 58 21.322 100 45 11.477	84 54 18.1 146 57 30.0	264 50 37.4 326 56 20.2	Sween..... Center XVI.....	5,974.5 3,448.9	3.776302 3.537682
Good.....	49 01 31.276 100 45 03.399	1 36 13.4 34 29 05.1 94 55 53.8	181 36 07.3 214 27 49.2 274 52 32.9	Mouse..... Center XVI..... Smith.....	5,870.3 3,611.4 5,426.3	3.768658 3.557674 3.734501
Knoll.....	49 01 29.666 100 39 05.859	51 58 53.3 90 25 47.1	231 54 17.4 270 21 17.2	Mouse..... Good.....	9,438.4 7,263.9	3.974898 3.861171
Steele.....	48 58 28.111 100 39 03.296	88 26 03.1 127 44 35.0 179 28 05.2	268 21 25.4 307 40 03.3 359 28 03.3	Mouse..... Good..... Knoll.....	7,490.6 9,251.5 5,608.8	3.874517 3.966214 3.748867
Turtle.....	49 02 35.083 100 30 56.644	52 24 13.2 78 33 22.2	232 18 05.8 258 27 12.8	Steele..... Knoll.....	12,490.8 10,140.5	4.096589 4.006059
Bottineau.....	48 59 57.767 100 30 45.163	74 45 27.9 105 38 32.8 177 15 11.1	254 39 12.0 285 32 14.9 357 15 02.5	Steele..... Knoll..... Turtle.....	10,499.6 10,563.4 4,865.4	4.021174 4.023803 3.687116
Steele 2.....	48 58 28.987 100 39 06.299	180 05 30.5 254 52 56.0	0 05 30.8 74 59 14.1	Knoll..... Bottineau.....	5,581.5 10,551.5	3.746748 4.023313
Rock.....	48 58 43.195 100 37 26.632	77 47 30.9 158 35 46.3 254 11 49.3	257 46 15.7 338 34 31.4 74 16 52.2	Steele 2..... Knoll..... Bottineau.....	2,073.8 5,523.9 8,481.0	3.316760 3.742246 3.928446
Souris west base.....	48 59 42.717 100 40 42.373	210 41 09.2 319 22 18.6	30 42 22.0 139 23 31.1	Knoll..... Steele 2.....	3,842.2 3,000.5	3.584577 3.477199
Souris east base.....	48 59 42.522 100 38 48.001	9 18 11.1 90 09 35.3 173 44 41.0 317 55 10.9	189 17 57.3 270 08 09.0 353 44 27.5 137 56 12.4	Steele 2..... Souris west base..... Knoll..... Rock.....	2,301.9 2,324.96 3,329.7 2,468.9	3.362080 3.366416 3.522402 3.392512
Center XVII.....	49 00 44.021 100 26 20.599	75 08 44.9 121 29 14.6	255 05 25.2 301 25 46.2	Bottineau..... Turtle.....	5,563.6 6,574.1	3.745353 3.817837
Summit.....	48 59 57.764 100 25 46.503	90 01 55.4 127 40 25.1 154 08 00.4	269 58 10.0 307 36 31.0 334 07 34.7	Bottineau..... Turtle..... Center XVII.....	6,070.7 7,957.7 1,588.1	3.783237 3.900786 3.200882

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Bois.....	49 01 16.596 100 24 37.960	29 46 33.8 64 15 10.7 107 32 04.8	209 45 42.0 244 13 53.2 287 27 18.8	Summit..... Center XVII..... Turtle.....	2,805.5 2,315.6 8,065.3	3.448008 3.364669 3.906621
Fish.....	49 00 38.242 100 19 32.359	80 42 04.2 100 50 04.3	260 37 21.8 280 46 13.6	Summit..... Bois.....	7,706.3 6,321.7	3.886844 3.800837
Field.....	48 58 06.534 100 18 43.325	111 48 48.0 129 11 51.5 167 59 46.8	201 43 28.7 309 07 23.9 347 59 09.8	Summit..... Bois..... Fish.....	9,265.1 9,297.6 4,791.4	3.966849 3.968369 3.680459
Ack.....	48 57 52.364 100 13 49.943	94 13 34.5 126 23 28.1	274 09 53.2 306 19 09.7	Field..... Fish.....	5,983.3 8,644.3	3.776943 3.936728
Fair.....	49 01 37.074 100 13 06.604	7 14 15.1 46 29 49.2 76 59 09.2	187 13 42.4 226 25 35.1 256 54 18.0	Ack..... Field..... Fish.....	6,997.3 9,441.8 8,045.9	3.844931 3.975057 3.905574
Worth.....	48 59 13.410 100 02 04.844	80 10 10.7 108 19 52.9	260 01 18.8 288 11 33.4	Ack..... Fair.....	14,555.8 14,162.5	4.163037 4.151139
Ninga.....	49 01 51.470 99 59 58.012	27 50 32.0 66 29 32.1 88 29 33.2	207 48 56.3 246 19 04.3 268 19 37.8	Worth..... Ack..... Fair.....	5,521.3 18,453.5 16,025.9	3.742039 4.266078 4.204823
Center XIX.....	49 00 24.425 99 57 59.242	66 18 17.0 138 06 22.8	246 15 11.7 318 04 53.2	Worth..... Ninga.....	5,453.1 3,613.1	3.736646 3.557879
Center XX.....	49 00 08.581 99 51 06.104	82 48 57.5 93 22 44.6 106 26 35.7	262 40 40.4 273 17 32.7 286 19 54.1	Worth..... Center XIX..... Ninga.....	13,499.0 8,411.0 11,265.7	4.130363 3.924847 4.051758
St. Johns.....	48 59 23.568 99 48 57.402	88 57 35.1 99 44 35.6 108 51 51.9 118 00 15.1	268 47 40.9 279 37 46.6 288 43 33.2 297 58 38.0	Worth..... Center XIX..... Ninga..... Center XX.....	16,012.4 11,173.2 14,181.1 2,962.8	4.204457 4.048177 4.151709 3.471702
Bannerman.....	49 02 52.568 99 48 21.707	6 24 47.4 33 24 50.9 68 45 07.2 82 28 16.9	186 24 20.5 213 22 46.8 248 37 51.2 262 19 31.1	St. Johns..... Center XX..... Center XIX..... Ninga.....	6,496.9 6,067.7 12,593.6 14,267.4	3.812708 3.783025 4.100149 4.154346
Bannerman north base.....	49 02 07.207 99 47 53.345	14 26 48.7 46 55 27.7	194 26 00.4 226 53 02.2	St. Johns..... Center XX.....	5,220.0 5,363.6	3.717667 3.729457
East.....	49 02 22.569 99 46 25.710	29 09 09.8 54 01 45.4 75 04 51.1 111 29 11.6	209 07 15.3 233 58 13.7 255 03 44.9 291 27 44.0	St. Johns..... Center XX..... Bannerman north base..... Bannerman.....	6,330.7 7,041.8 1,842.1 2,531.4	3.801451 3.847684 3.265317 3.403364
Bannerman south base.....	49 00 32.489 99 45 44.792	61 28 56.8 83 34 53.4 138 15 38.5 166 16 02.1	241 26 31.4 263 30 50.9 318 14 01.4 346 15 31.2	St. Johns..... Center XX..... Bannerman north base..... East.....	4,456.5 6,571.9 3,922.14 3,500.7	3.648994 3.817692 3.593523 3.544154
Center XXI.....	49 00 24.664 99 42 54.921	75 40 14.9 130 24 11.1	255 35 41.3 310 21 32.0	St. Johns..... East.....	7,606.0 5,622.0	3.881156 3.749888
Rolla.....	48 58 57.860 99 40 35.565	94 30 11.8 133 26 32.6	274 23 53.1 313 24 47.4	St. Johns..... Center XXI.....	10,234.1 3,900.7	4.010050 3.591145
Lena.....	49 01 57.507 99 40 35.176	0 04 52.7 44 43 34.0 65 04 11.4 96 14 33.1	180 04 52.4 224 41 48.5 244 57 52.3 276 10 08.4	Rolla..... Center XXI..... St. Johns..... East.....	5,549.6 4,035.8 11,259.5 7,161.8	3.744262 3.605933 4.051520 3.855023
Center XXII.....	48 59 59.790 99 37 37.905	62 06 28.5 135 17 26.2	242 04 14.5 315 15 12.4	Rolla..... Lena.....	4,087.2 5,118.4	3.611421 3.709137
Enter.....	49 01 43.792 99 35 30.724	38 49 35.8 93 57 02.8	218 47 59.8 273 53 12.9	Center XXII..... Lena.....	4,123.2 6,199.0	3.615233 3.792322
Prise.....	48 58 43.759 99 34 23.622	93 20 05.5 120 45 26.6 166 13 42.4	273 15 24.8 300 42 59.9 346 12 51.7	Rolla..... Center XXII..... Enter.....	7,575.6 4,595.4 5,726.3	3.879415 3.662325 3.757871
Center XXIII.....	48 59 57.857 99 32 25.142	46 28 22.8 130 58 13.2	226 26 53.4 310 55 53.1	Prise..... Enter.....	3,322.9 4,963.0	3.521515 3.698365
Home.....	49 02 06.289 99 28 57.281	46 22 12.8 84 37 55.4	226 19 35.9 264 32 58.3	Center XXIII..... Enter.....	5,837.2 8,027.8	3.766206 3.904594
Field.....	48 58 55.448 99 28 19.232	87 14 54.4 111 06 51.4 120 42 48.2 172 36 29.8	267 10 19.5 291 03 45.8 300 37 22.5 352 36 01.1	Prise..... Center XXIII..... Enter..... Home.....	7,418.3 5,358.2 10,195.6 6,007.2	3.870305 3.729017 4.008413 3.778669
Hans.....	48 58 35.090 99 20 38.472	93 53 16.5 123 03 44.5	273 47 28.9 302 57 28.1	Field..... Home.....	9,390.5 12,089.2	3.972687 4.082396
Wright.....	49 02 06.480 99 19 58.616	7 04 30.9 59 56 11.9 90 20 56.0	187 04 00.8 239 49 54.1 270 14 09.3	Hans..... Field..... Home.....	6,580.2 11,761.5 10,941.4	3.818240 4.070463 4.039072

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	"	°	'	"	°	'	"			
Clear.....	49 02 04.657	58 59 42.8	238 53 03.7	99 11 49.600	90 22 33.2	270 16 24.0	Hans.....	12,547.7	4.098566			
							Wright.....	9,933.0	3.997082			
Ridge.....	48 58 45.947	88 27 53.0	268 20 26.8	99 10 46.981	118 58 52.4	298 51 56.1	Hans.....	12,032.7	4.080363			
							Wright.....	12,808.6	4.107503			
							Clear.....	6,269.0	3.797200			
Wills.....	49 01 44.389	43 14 25.8	223 11 13.5	99 06 32.166	95 34 45.4	275 30 45.7	Ridge.....	7,563.6	3.878729			
							Clear.....	6,478.4	3.811469			
Mott.....	48 58 16.427	96 39 49.0	276 34 57.7	99 04 20.809	127 44 54.2	307 39 15.5	Ridge.....	7,906.0	3.897959			
							Clear.....	11,528.7	4.061782			
							Wills.....	6,957.0	3.842422			
Center XXIV.....	49 00 55.474	123 30 30.8	303 29 06.0	99 04 39.785	355 30 31.2	175 30 45.5	Wills.....	2,738.0	3.437431			
							Mott.....	4,928.3	3.692700			
Sarles.....	48 58 21.336	88 45 44.4	268 41 31.2	98 58 45.176	123 28 59.3	303 24 31.7	Mott.....	6,827.6	3.834268			
							Center XXIV.....	8,639.3	3.936479			
Crystal.....	49 01 54.136	3 04 36.3	183 04 23.2	98 58 27.803	46 53 23.4	226 48 57.0	Sarles.....	6,583.2	3.818435			
							Mott.....	9,834.2	3.992739			
							Center XXIV.....	7,771.6	3.890511			
							Wills.....	9,843.8	3.993165			
City.....	49 02 16.025	39 57 54.6	219 54 09.2	98 53 46.555	83 16 42.6	263 13 10.2	Sarles.....	9,455.0	3.975660			
							Crystal.....	5,752.6	3.759861			
Badger.....	48 58 04.716	94 36 00.3	274 32 01.8	98 53 29.159	139 27 02.1	319 23 16.6	Sarles.....	6,447.7	3.809403			
							Crystal.....	9,331.4	3.969946			
							City.....	7,771.4	3.890498			
Center XXV.....	49 00 35.974	46 21 31.4	226 18 29.7	98 49 28.374	120 32 07.0	300 28 52.1	Badger.....	6,767.4	3.830419			
							City.....	6,088.2	3.784488			
Star.....	49 03 34.547	50 19 00.8	230 11 25.7	98 43 26.197	53 10 22.1	233 05 48.6	Badger.....	15,935.5	4.202366			
							Center XXV.....	9,195.1	3.963557			
							City.....	12,828.6	4.108180			
Hannah.....	49 00 00.452	74 12 02.8	254 04 16.0	98 43 10.409	98 10 09.2	278 05 23.9	Badger.....	13,078.9	4.116573			
							Center XXV.....	7,759.8	3.889849			
							Star.....	6,621.6	3.820960			
Hannah north base.....	49 02 07.621	25 17 04.6	205 15 55.7	98 41 39.120	141 00 46.9	320 59 26.1	Hannah.....	4,344.4	3.637926			
							Star.....	3,455.3	3.538481			
Hannah south base.....	49 00 37.725	58 23 55.0	238 22 45.5	98 41 38.361	158 09 39.9	338 08 18.5	Hannah.....	2,196.7	3.341774			
							Star.....	5,885.2	3.769758			
							Hannah north base.....	2,777.10	3.443592			
Star Mound.....	49 03 34.228	256 57 28.0	76 57 29.4	98 43 28.276	320 20 49.0	140 22 11.4	Star Mound (G. S. of C.).....	39.87	1.60066			
							Hannah north base.....	3,474.4	3.540879			
							Hannah south base.....	5,891.9	3.770254			
							Hannah.....	6,613.9	3.820457			
Flake.....	49 01 10.123	79 44 50.4	259 37 31.1	98 33 28.425	110 14 24.2	290 06 52.8	Hannah.....	12,021.4	4.079956			
							Star.....	12,934.6	4.111753			
Wales.....	48 57 50.544	108 44 32.3	288 37 11.9	98 33 26.702	131 09 39.3	311 02 06.8	Hannah.....	12,528.8	4.097911			
							Star.....	16,166.1	4.208605			
							Flake.....	6,165.4	3.789961			
Bray.....	49 00 46.082	59 50 50.3	239 45 04.5	98 25 48.446	94 35 28.4	274 29 41.1	Wales.....	10,779.9	4.032616			
							Flake.....	9,376.0	3.972019			
Post.....	48 58 21.793	85 10 41.3	265 03 41.9	98 24 10.819	114 42 08.1	294 35 07.2	Wales.....	11,347.2	4.054889			
							Flake.....	12,470.7	4.095890			
							Bray.....	4,879.2	3.688347			
Windy.....	49 01 30.877	32 56 24.2	212 54 03.8	98 21 04.768	76 31 46.0	256 28 11.8	Post.....	6,958.5	3.842514			
							Bray.....	5,927.6	3.772880			
Gates.....	48 58 24.107	89 22 16.1	269 18 26.2	98 19 06.069	118 14 28.6	298 09 24.9	Post.....	6,198.1	3.792262			
							Bray.....	9,281.5	3.967617			
							Windy.....	6,253.8	3.796144			
Center XXVI.....	49 00 03.401	29 22 02.4	209 20 58.3	98 17 41.204	123 10 36.5	303 08 02.8	Gates.....	3,519.3	3.546458			
							Windy.....	4,941.0	3.693818			
North Pembina.....	49 01 56.942	35 41 19.8	215 38 24.6	98 15 13.923	40 29 11.9	220 27 20.8	Gates.....	8,092.6	3.908090			
							Center XXVI.....	4,610.7	3.663764			
							Windy.....	7,172.5	3.855671			
Church.....	48 56 54.781	111 10 00.2	291 05 35.5	98 13 15.069	131 49 05.2	311 43 10.9	Gates.....	7,654.7	3.883927			
							Windy.....	12,803.9	4.107342			
							Center XXVI.....	7,952.5	3.900505			
							North Pembina.....	9,641.9	3.984162			
Ice.....	49 02 43.507	5 36 02.9	185 35 23.7	98 12 23.149	67 29 34.2	247 27 25.2	Church.....	10,824.2	4.034397			
							North Pembina.....	3,754.9	3.574600			
South Pembina.....	49 00 00.226	26 57 30.0	206 55 42.0	98 10 51.889	124 07 57.1	304 04 39.3	Church.....	6,426.2	3.807953			
							North Pembina.....	6,430.3	3.808232			
							Ice.....	5,374.0	3.730297			

## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Center XXVII.....	49 01 47.980 98 08 06.893	45 13 24.0 108 16 02.8	225 11 19.4 288 12 49.3	South Pembina..... Ice.....	4,724.5 5,480.1	3.674357 3.738790
Oak.....	49 03 07.393 98 08 00.794	2 53 25.8 82 08 29.6	182 53 21.2 262 05 11.6	Center XXVII..... Ice.....	2,456.3 5,378.3	3.390290 3.730644
Birch.....	49 00 11.532 98 06 59.142	85 48 06.7 155 12 28.5 167 01 26.9	265 45 11.0 335 11 37.4 347 00 40.4	South Pembina..... Center XXVII..... Oak.....	4,743.5 3,282.1 5,575.2	3.676103 3.516151 3.746257
North Outlook.....	49 02 57.954 98 05 31.902	19 01 48.4 95 31 28.6	199 00 42.5 275 29 36.1	Birch..... Oak.....	5,438.0 3,037.4	3.735437 3.482495
South Outlook.....	49 00 55.788 98 05 30.818	52 42 51.8 143 10 14.8 179 39 56.7	232 41 45.1 323 08 21.5 359 39 55.9	Birch..... Oak..... North Outlook.....	2,256.3 5,080.2 3,774.0	3.353397 3.705855 3.576801
Haskett north base station.....	49 02 42.019 97 58 59.316	67 37 05.4 93 34 28.6	247 32 09.8 273 29 32.1	South Outlook..... North Outlook.....	8,603.4 7,987.4	3.934698 3.902405
Haskett south base station.....	49 00 21.621 97 57 40.800	88 29 07.3 96 21 18.1 116 49 33.1 159 48 56.6	268 22 05.8 276 15 23.3 296 43 37.4 339 47 57.3	Birch..... South Outlook..... North Outlook..... Haskett north base station.....	11,352.2 9,609.7 10,719.8 4,621.17	4.055078 3.982711 4.030188 3.664752
Haskett north base mark.....	49 02 37.023 97 59 16.185	245 44 44.8	65 44 57.5	Haskett north base station.....	375.74	2.574882
Haskett south base mark.....	49 00 20.968 97 57 43.003	155 45 43.4 245 45 43.7	335 44 33.1 65 45 45.3	Haskett north base mark..... Haskett south base station.....	4,609.64 49.10	3.663666 1.691107
Wink.....	49 02 41.853 97 55 01.394	36 47 49.1 90 05 08.0	216 45 48.8 270 02 08.3	Haskett south base station..... Haskett north base station.....	5,408.7 4,831.7	3.733093 3.684096
Kloss.....	49 00 28.737 97 54 39.515	86 36 15.5 127 59 05.4 173 49 58.9	266 33 58.7 307 55 49.3 353 49 42.4	Haskett south base station..... Haskett north base station..... Wink.....	3,690.9 6,604.0 4,136.1	3.567128 3.825683 3.616596
Center XXVIII.....	49 01 11.184 97 51 50.581	69 06 42.7 125 52 24.7	249 04 35.1 305 50 00.6	Kloss..... Wink.....	3,674.7 4,782.1	3.565222 3.679617
Rhine.....	49 02 41.213 97 50 27.042	31 23 52.4 90 13 55.7	211 22 49.4 270 10 28.5	Center XXVIII..... Wink.....	3,258.0 5,571.5	3.512947 3.745972
Berg.....	49 00 28.932 97 50 22.055	89 57 39.9 125 58 23.6 178 34 48.1	269 54 25.6 305 57 16.8 358 34 44.3	Kloss..... Center XXVIII..... Rhine.....	5,232.3 2,222.5 4,087.7	3.718692 3.345848 3.611474
Center XXIX.....	49 01 31.038 97 49 05.684	38 58 28.1 142 41 25.8	218 57 30.5 322 40 24.4	Berg..... Rhine.....	2,467.6 2,725.8	3.392270 3.435502
Plum.....	49 02 37.952 97 46 49.500	47 18 54.5 53 14 40.2 91 19 44.5	227 16 14.1 233 12 57.4 271 17 00.3	Berg..... Center XXIX..... Rhine.....	5,876.4 3,453.2 4,419.0	3.769110 3.538220 3.645323
Wall.....	49 00 08.565 97 46 30.796	97 38 55.3 129 00 20.9 175 17 41.7	277 36 00.9 308 58 24.1 355 17 27.6	Berg..... Center XXIX..... Plum.....	4,742.0 4,049.3 4,630.4	3.675658 3.607380 3.65621
Center XXX.....	49 01 25.975 97 45 05.602	35 54 43.3 136 30 20.3	215 53 39.0 316 29 01.9	Wall..... Plum.....	2,952.2 3,065.6	3.470147 3.486511
Glen.....	49 02 04.887 97 42 58.411	65 03 49.6 102 18 06.7	245 02 13.7 282 15 12.5	Center XXX..... Plum.....	2,849.7 4,803.3	3.454803 3.681540
Cross.....	48 59 41.557 97 42 28.268	99 37 52.2 135 16 06.4 172 07 37.3	279 34 49.3 315 14 07.7 352 07 14.5	Wall..... Center XXX..... Glen.....	4,999.9 4,541.8 4,469.9	3.698962 3.657230 3.650296
Center XXXI.....	49 01 07.258 97 39 40.983	52 06 32.9 113 57 19.1	232 04 26.6 293 54 50.0	Cross..... Glen.....	4,309.0 4,388.2	3.634379 3.642282
Lowe.....	49 02 11.045 97 38 19.871	39 54 42.3 88 06 12.7	219 53 41.1 268 02 42.4	Center XXXI..... Glen.....	2,568.6 5,660.8	3.409701 3.752877
Buy.....	49 00 03.612 97 38 17.443	82 24 52.8 139 11 58.0 179 16 56.4	262 21 43.5 319 10 55.0 359 16 54.6	Cross..... Center XXXI..... Lowe.....	5,143.8 2,597.7 3,936.9	3.711284 3.414581 3.595156
Center XXXII.....	49 01 09.837 97 36 39.170	44 19 12.1 132 45 26.0	224 17 57.9 312 44 10.0	Buy..... Lowe.....	2,859.0 2,785.7	3.456209 3.444933
Gretna.....	49 02 24.019 97 34 50.815	43 51 27.5 84 37 47.0	223 50 05.7 264 35 09.2	Center XXXII..... Lowe.....	3,177.5 4,264.9	3.502082 3.629909
Nече.....	49 00 02.513 97 34 09.875	90 24 45.6 124 26 46.0 169 13 49.9 263 34 48.5	270 21 38.9 304 24 53.4 349 13 19.0 113 36 12.9	Buy..... Center XXXII..... Gretna..... Nече (G. S. of C.).....	5,032.1 3,678.4 4,449.8 2,480.1	3.701750 3.565655 3.648341 3.394461
Center XXXIII.....	49 00 53.499 97 32 00.552	59 04 49.0 128 58 18.6	239 03 11.4 308 56 10.0	Nече..... Gretna.....	3,064.0 4,447.8	3.486292 3.648149
Short.....	49 01 48.232 97 31 11.773	30 22 54.1 103 58 39.5	210 22 17.3 283 55 54.2	Center XXXIII..... Gretna.....	1,959.8 4,584.4	3.292217 3.661286



## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	"	°	'	"	°	'	"			
Long.....	48	59	38.889	101	08	52.5	281	06	34.7	Neché.....	3,781.1	3.577617
	97	31	07.361	154	52	36.0	334	51	55.9	Center XXXIII.....	2,545.8	3.405821
				178	42	53.6	358	42	50.3	Short.....	3,996.6	3.601693
Neché west base.....	49	00	02.037	90	40	38.3	270	39	51.7	Neché.....	1,255.7	3.098902
	97	33	08.098	220	48	12.9	40	49	03.9	Center XXXIII.....	2,100.4	3.322301
				286	13	55.4	106	15	26.5	Long.....	2,556.3	3.407615
				313	52	14.8	133	52	52.6	Neché (G. S. of C.).....	1,410.9	3.149481
Neché east base.....	49	00	01.973	2	48	08.8	182	48	07.5	Long.....	714.0	2.853668
	97	31	05.644	90	03	32.6	270	02	00.2	Neché west base.....	2,489.00	3.396025
				144	58	22.5	324	57	41.1	Center XXXIII.....	1,943.9	3.288682
Center XXXIV.....	49	00	54.768	56	50	25.9	236	48	12.8	Long.....	4,283.4	3.631784
	97	28	10.968	114	13	40.6	294	11	24.2	Short.....	4,027.6	3.605049
Den.....	48	59	02.405	98	54	05.7	278	49	37.5	Long.....	7,314.0	3.864156
	97	25	11.905	133	39	36.7	313	37	21.5	Center XXXIV.....	5,029.5	3.701526
More.....	49	01	48.001	0	29	34.8	180	29	33.2	Den.....	5,115.7	3.708906
	97	25	09.738	65	57	10.6	245	54	53.8	Center XXXIV.....	4,032.6	3.605581
				90	05	37.4	270	01	04.1	Short.....	7,354.4	3.866545
Center XXXV.....	49	00	43.204	38	30	14.1	218	28	42.2	Den.....	3,978.3	3.599698
	97	23	10.092	129	28	52.2	309	27	21.9	More.....	3,149.0	3.498173
Halb.....	48	59	09.804	88	05	35.1	268	01	24.9	Den.....	6,745.7	3.829027
	97	19	40.322	124	06	25.7	304	03	47.4	Center XXXV.....	5,148.4	3.711670
Let.....	49	01	48.788	1	44	51.0	181	44	45.4	Halb.....	4,913.5	3.691395
	97	19	32.952	65	21	25.3	245	18	41.3	Center XXXV.....	4,854.7	3.686164
				89	49	54.3	269	45	39.9	More.....	6,841.5	3.835152
Center XXXVI.....	49	00	17.445	64	51	08.1	244	48	23.0	Halb.....	4,912.9	3.691336
	97	16	01.590	123	19	42.0	303	17	02.4	Let.....	5,138.7	3.710854
Nash.....	48	58	38.423	99	56	10.7	279	52	44.8	Halb.....	5,634.2	3.750830
	97	15	07.367	160	11	17.7	340	10	36.8	Center XXXVI.....	3,251.5	3.512086
Wet.....	49	01	48.025	4	55	21.6	184	55	02.9	Nash.....	5,878.8	3.769286
	97	14	42.560	29	51	33.4	209	50	33.8	Center XXXVI.....	3,226.2	3.508689
				90	15	34.3	270	11	55.1	Let.....	5,899.0	3.770782
Emerson.....	49	00	20.516	41	38	45.7	221	37	01.6	Nash.....	4,219.5	3.625264
	97	12	49.480	139	38	56.8	319	37	31.4	Wet.....	3,547.8	3.549962
Barnet.....	48	58	39.149	89	44	45.3	269	41	53.8	Nash.....	4,622.2	3.664845
	97	11	20.074	149	52	35.5	329	51	28.0	Emerson.....	3,620.7	3.558790
Elkins.....	49	01	47.790	11	47	00.9	191	46	15.8	Barnet.....	5,952.8	3.774718
	97	10	20.294	48	21	57.1	228	20	04.5	Emerson.....	4,056.8	3.608182
				90	06	19.6	270	03	01.6	Wet.....	5,327.7	3.726539
States (U. S. C. & G. S.).....	49	00	01.447	60	29	26.8	240	26	40.3	Barnet.....	5,157.7	3.712457
	97	07	39.343	135	08	39.8	315	06	38.3	Elkins.....	4,635.6	3.666102
Finney.....	48	58	42.448	89	16	47.6	269	12	02.3	Barnet.....	7,687.7	3.885796
	97	05	02.057	127	21	58.5	307	19	59.8	States.....	4,022.5	3.604498
Shultz.....	49	01	48.269	0	09	45.9	180	09	45.3	Finney.....	5,740.3	3.758937
	97	05	01.255	44	14	45.5	224	12	46.1	States.....	4,605.3	3.663255
				89	54	09.4	269	50	08.5	Elkins.....	6,481.0	3.811639
Humboldt.....	48	55	10.461	158	36	04.7	338	33	54.0	States.....	9,655.7	3.984783
	97	04	46.022	177	08	57.9	357	08	45.8	Finney.....	6,556.7	3.816684
Joe.....	48	58	29.012	53	50	36.8	233	45	26.2	Humboldt.....	10,385.2	4.016414
	96	57	54.157	92	46	32.8	272	41	10.0	Finney.....	8,711.5	3.940094
				125	23	03.6	305	17	41.3	Shultz.....	10,641.7	4.027011
Schrader.....	49	01	47.427	0	00	12.3	180	00	12.3	Joe.....	6,129.4	3.787415
	96	57	54.140	56	44	19.9	236	38	57.0	Finney.....	10,406.4	4.017302
				90	12	59.8	270	07	37.4	Shultz.....	8,676.4	3.938341
Orleans.....	48	56	02.284	81	57	28.7	261	50	32.1	Humboldt.....	11,361.7	4.055445
	96	55	33.436	113	12	58.2	293	05	49.5	Finney.....	12,581.7	4.099738
				116	39	32.5	296	30	24.9	States.....	16,509.9	4.217744
				147	44	13.2	327	42	27.1	Joe.....	5,361.1	3.729250
Canada (U. S. C. & G. S.).....	49	00	00.967	21	09	57.6	201	08	11.8	Orleans.....	7,905.8	3.897948
	96	53	13.184	57	35	11.2	237	26	28.6	Humboldt.....	16,708.6	4.222939
				63	35	24.4	243	31	52.4	Joe.....	6,379.9	3.804811
				90	08	20.7	269	57	27.0	States.....	17,605.6	4.245650
				119	58	25.2	299	54	53.1	Schrader.....	6,588.5	3.818789
Kraska.....	48	58	24.393	90	49	47.8	270	43	17.0	Joe.....	10,538.7	4.022786
	96	49	15.995	120	49	48.2	300	43	17.2	Schrader.....	12,257.7	4.088409
				121	46	02.4	301	43	03.5	Canada.....	5,670.6	3.753627
Shock.....	49	01	44.336	0	20	48.0	180	20	46.6	Kraska.....	6,176.7	3.790754
	96	49	14.158	56	42	08.2	236	39	07.8	Canada.....	5,812.7	3.764379
				90	34	20.4	270	27	47.8	Schrader.....	10,563.4	4.023805
Casa.....	49	01	47.608	55	36	04.2	235	30	24.3	Kraska.....	11,098.5	4.045263
	96	41	45.700	89	24	41.0	269	19	02.4	Shock.....	9,110.6	3.959546



## GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	"	°	'	"	°	'	"			
Wood.....	48 58	12.247		92 17	18.6		272 11	22.6		Kraska.....	9,603.6	3.982432
	96 41	24.150		124 29	28.8		304 23	34.1		Shock.....	11,584.3	4.063869
				176 14	06.8		356 13	50.5		Casa.....	6,667.2	3.823945
Soft.....	49 02	21.194		37 47	44.0		217 44	02.8		Wood.....	9,728.1	3.988027
	96 36	31.017		80 48	47.3		280 44	49.7		Casa.....	6,475.5	3.811274
Kelson.....	48 58	44.638		81 10	05.9		261 06	07.9		Wood.....	6,493.0	3.812448
	96 36	08.683		129 33	51.5		309 29	37.1		Casa.....	8,880.6	3.948443
				176 07	15.1		356 06	58.2		Soft.....	6,705.1	3.826408
Vita.....	49 03	51.842		25 56	27.3		205 53	35.9		Kelson.....	10,551.2	4.023302
	96 32	21.703		61 04	35.8		241 01	27.4		Soft.....	5,785.2	3.762320
Roseau.....	49 00	00.546		67 01	22.1		246 57	57.1		Kelson.....	5,999.9	3.778144
	96 31	37.035		126 03	46.1		306 00	04.1		Soft.....	7,386.2	3.868424
				172 46	03.2		352 45	29.5		Vita.....	7,202.5	3.857484
Arbakka.....	49 02	26.034		39 17	08.4		219 14	51.9		Roseau.....	5,805.1	3.763812
	96 28	36.197		120 05	26.9		300 02	36.6		Vita.....	5,290.8	3.723521
Mon. 871.....	49 00	00.284		90 05	55.7		269 59	11.2		Roseau.....	10,894.7	4.037215
	96 22	41.040		121 59	58.2		301 55	30.1		Arbakka.....	8,505.5	3.929700
Caliento.....	49 04	04.477		0 06	28.2		180 06	27.6		Mon. 871.....	7,543.6	3.877576
	96 22	40.341		67 12	41.8		247 08	13.0		Arbakka.....	7,839.2	3.894273
				88 10	00.4		268 02	41.2		Vita.....	11,807.6	4.072163
Suran.....	49 00	53.443		80 19	35.9		260 13	39.9		Mon. 871.....	9,723.8	3.987834
	96 14	49.454		121 43	38.3		301 37	42.7		Caliento.....	11,237.6	4.050675
Sundown.....	49 04	42.288		6 28	33.8		186 28	04.0		Suran.....	7,114.8	3.852163
	96 14	09.963		50 02	52.9		229 56	26.9		Mon. 871.....	13,551.3	4.131981
				83 37	11.8		263 30	46.2		Caliento.....	10,424.5	4.018054
Piney.....	49 04	43.539		58 00	16.8		237 53	14.6		Suran.....	13,393.4	4.126890
	96 05	30.460		89 50	40.0		269 44	07.4		Sundown.....	10,542.9	4.022962
Duxby.....	48 54	31.611		129 10	14.1		309 01	15.8		Suran.....	18,704.3	4.271941
	96 02	55.832		170 34	30.4		350 32	33.7		Piney.....	19,163.0	4.282463
Mon. 888.....	48 59	59.849		17 50	36.2		197 48	35.3		Duxby.....	10,651.1	4.027394
	96 00	15.560		95 25	02.2		275 14	02.5		Suran.....	17,837.3	4.251328
				117 19	44.5		297 09	14.3		Sundown.....	19,061.0	4.280146
				143 54	41.3		323 50	43.5		Piney.....	10,849.3	4.035401
Wampum.....	49 00	55.613		48 24	28.6		228 16	14.2		Duxby.....	17,845.7	4.251533
	95 52	00.406		80 20	16.1		260 14	02.4		Mon. 888.....	10,209.4	4.009000
				113 15	27.3		293 05	15.5		Piney.....	17,893.3	4.252690
Sandy.....	48 51	43.735		110 10	25.0		290 01	40.9		Duxby.....	15,089.5	4.178675
	95 51	20.274		144 38	46.0		324 32	02.4		Mon. 888.....	18,803.7	4.274244
				177 15	41.2		357 15	10.9		Wampum.....	17,067.8	4.232177
Salol.....	48 51	58.827		88 49	54.8		268 37	01.1		Sandy.....	20,943.6	4.321052
	95 34	12.939		127 28	02.7		307 14	37.8		Wampum.....	27,328.6	4.436618
Mon. 903.....	48 59	57.435		5 56	28.3		185 55	31.4		Salol.....	14,864.4	4.172148
	95 32	57.446		55 55	22.1		235 41	30.7		Sandy.....	27,138.0	4.433578
				94 32	38.4		274 18	15.7		Wampum.....	23,297.9	4.367317
Guibo.....	48 54	20.383		72 12	49.9		252 04	27.9		Salol.....	14,261.1	4.154153
	95 23	06.641		130 57	40.3		310 50	14.7		Mon. 903.....	15,902.7	4.201470
Warroad north base=Mon. 909.....	48 59	56.463		4 04	07.3		184 03	39.9		Guibo.....	10,408.1	4.017373
	95 22	30.377		44 10	34.1		224 01	44.4		Salol.....	20,547.0	4.312749
				90 12	02.9		270 04	09.6		Mon. 903.....	12,746.1	4.105379
Warroad south base.....	48 55	19.862		67 02	37.7		246 59	57.3		Guibo.....	4,706.5	3.672701
	95 19	33.829		157 13	15.71		337 11	02.55		Warroad north base.....	9,268.657	3.9670168
Buffalo.....	48 59	58.700		38 35	26.6		218 31	12.0		Warroad south base.....	11,014.9	4.041979
	95 13	56.339		47 01	44.0		226 54	48.9		Guibo.....	15,315.9	4.185143
				89 40	29.7		269 34	01.8		Warroad north base.....	10,448.8	4.019066
Willow 1913.....	48 54	17.122		97 51	21.9		277 42	37.0		Warroad south base.....	14,311.1	4.155674
	95 07	57.445		120 38	29.9		300 27	31.6		Warroad north base.....	20,623.3	4.314358
				145 21	14.5		325 16	43.8		Buffalo.....	12,831.9	4.108292
Gull Island.....	48 59	02.469		31 35	49.9		211 32	29.2		Willow 1913.....	10,345.8	4.014764
	95 03	31.269		70 45	09.0		250 33	03.1		Warroad south base.....	20,755.7	4.317138
				94 14	20.8		274 00	01.2		Warroad north base.....	23,217.6	4.365817
Stoney.....	49 09	03.604		0 01	11.3		180 01	11.0		Willow 1913.....	27,385.0	4.437512
	95 07	56.980		46 27	16.55		226 16	16.64		Warroad north base.....	24,492.88	4.3890398
				343 46	35.8		163 49	56.6		Gull Island.....	19,337.7	4.286404
Gould.....	49 07	36.412		25 05	35.0		205 01	27.8		Warroad north base.....	15,685.1	4.195487
	95 17	03.126		256 16	02.4		76 22	55.5		Stoney.....	11,393.1	4.056643
				313 50	25.0		134 00	38.3		Gull Island.....	22,886.2	4.359574
Mon. 913.....	49 10	50.280		58 00	14.2		237 54	17.0		Gould.....	11,287.5	4.052596
	95 09	10.972		335 32	01.2		155 32	57.1		Stoney.....	3,620.4	3.558756
Lone tree.....	49 08	47.383		77 34	46.0		257 28	36.0		Gould.....	10,152.0	4.006551
	95 08	54.118		174 51	45.3		354 51	32.6		Mon. 913.....	3,811.9	3.581146
				246 35	34.7		66 36	17.9		Stoney.....	1,261.7	3.100959

GEOGRAPHIC POSITIONS OF TRIANGULATION STATIONS AND MONUMENTS, GEORGIA  
STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Sumas Mountain.....	48 55 00.26 122 13 20.83	21 44 01 42 55 48 76 20 35	201 37 49 222 48 01 256 02 49	Whatcom..... Toad..... Pearson.....	27,278.5 18,584.6 29,672.3	4.435820 4.269153 4.472351
Mon. 20.....	49 00 08.78 122 28 29.92	297 10 09 345 42 36 346 18 49	117 21 34 165 46 14 166 24 01	Sumas Mountain..... Toad..... Whatcom.....	20,804.6 23,888.2 35,891.8	4.318160 4.378184 4.554995
Mon. 31.....	49 00 09.24 122 16 05.84	21 51 32 340 14 32 340 36 28	201 45 49 160 16 41 160 38 32	Toad..... Sumas..... Sumas Mountain.....	24,952.7 10,302.5 10,117.7	4.397118 4.012942 4.005082
Mon. 30-A.....	49 00 09.20 122 16 07.63	269 57 07	89 57 08	Mon. 31.....	37.44	1.573336
Mon. 41.....	49 00 09.31 122 07 33.22	35 39 11 36 33 49 90 02 28 90 05 41	215 34 53 216 29 27 269 56 02 269 49 53	Sumas..... Sumas Mountain..... Mon. 31..... Mon. 20.....	11,931.4 11,880.7 10,419.0 25,542.8	4.076690 4.074841 4.017827 4.407268
Chilliwack.....	49 06 20.66 122 08 26.19	15 30 51 15 55 54 39 10 21 316 02 29	195 27 13 195 52 12 219 04 34 136 14 13	Sumas..... Sumas Mountain..... Mon. 31..... Church.....	21,968.3 21,854.9 14,790.2 27,345.2	4.341796 4.339549 4.166975 4.436881
Black.....	48 59 08.46 122 01 04.34	62 19 33 146 08 35 302 28 25	242 10 23 326 03 02 122 34 35	Sumas..... Chilliwack..... Church.....	16,793.4 16,086.6 11,838.4	4.225139 4.206464 4.073291
Vedder (G. S. of C.).....	49 03 13.54 122 02 34.13	40 18 40 71 02 14 129 00 46 346 26 32	220 10 37 250 52 01 308 56 20 166 27 40	Sumas..... Mon. 31..... Chilliwack..... Black.....	20,162.9 17,444.8 9,190.3 7,787.6	4.304553 4.241666 3.963330 3.891406
Mon. 44.....	49 00 07.37 122 03 30.68	51 00 42 90 43 29 191 17 31	230 53 21 270 40 26 11 18 13	Sumas..... Mon. 41..... Vedder.....	15,300.4 4,929.9 5,864.8	4.184703 3.692839 3.768256
Mon. 42.....	49 00 09.31 122 06 30.83	40 18 55 270 55 12	220 13 50 90 57 28	Sumas..... Mon. 44.....	12,712.3 3,661.9	4.104224 3.563712
Mon. 43.....	49 00 09.27 122 05 48.42	43 09 45 90 04 45 271 11 26	223 04 08 270 04 13 91 13 09	Sumas..... Mon. 42..... Mon. 44.....	13,285.4 861.9 2,800.2	4.123375 2.935450 3.447187
Mon. 44-A.....	49 00 05.77 122 01 37.94	91 14 37 168 52 21	271 13 12 348 51 39	Mon. 44..... Vedder.....	2,292.2 5,911.7	3.360251 3.771714
Mon. 45.....	49 00 05.31 122 01 05.78	91 15 02	271 14 37	Mon. 44-A.....	653.6	2.815320
Amadis.....	49 01 16.12 121 57 20.96	49 02 38 67 25 54 119 43 39 124 55 59	228 59 49 247 22 49 269 39 42 304 47 37	Black..... Mon. 44-A..... Vedder..... Chilliwack.....	6,013.7 5,656.2 7,322.2 16,458.2	3.779139 3.752528 3.864640 4.216383
Isar.....	49 00 06.47 121 58 13.30	62 44 57 137 30 32 206 17 54	242 42 48 317 27 15 26 18 33	Black..... Vedder..... Amadis.....	3,911.7 7,840.3 2,400.0	3.592362 3.894331 3.380215
Mon. 46.....	49 00 02.81 121 58 13.10	177 59 07	357 59 07	Isar.....	113.32	2.054301
Mon. 47.....	49 00 00.88 121 56 03.06	75 13 17 93 44 55 145 44 54	255 09 29 273 43 17 325 43 55	Black..... Isar..... Amadis.....	6,335.1 2,652.8 2,812.3	3.801754 3.423712 3.449058
Liumchen.....	49 00 03.43 121 50 53.53	16 52 30 82 16 36 118 42 39	196 50 59 262 08 55 298 29 21	Church..... Black..... Chilliwack.....	8,425.5 12,532.5 24,344.1	3.925594 4.098039 4.386393
Mon. 48.....	48 59 56.16 121 50 57.72	200 46 56	20 47 00	Liumchen.....	240.09	2.380371
Thurston.....	49 06 25.60 121 45 59.43	23 00 09 26 51 40 53 47 01 89 49 17	202 54 56 206 47 58 233 35 38 269 32 19	Church..... Liumchen..... Black..... Chilliwack.....	21,578.6 13,230.3 22,804.5 27,316.5	4.334024 4.121571 4.358020 4.436424
McGuire.....	49 02 02.68 121 46 18.16	34 26 18 56 40 03 73 27 13 106 36 34 182 40 40	214 21 20 236 36 35 253 16 04 286 19 51 2 40 54	Church..... Liumchen..... Black..... Chilliwack..... Thurston.....	14,236.6 6,699.2 18,796.1 28,109.3 8,130.9	4.153406 3.826028 4.274067 4.448850 3.910140
Balan.....	48 59 52.84 121 47 02.15	94 00 16 192 33 31	273 57 21 12 34 04	Liumchen..... McGuire.....	4,714.5 4,109.7	3.673437 3.613808
Mon. 49.....	48 59 53.83 121 48 31.91	95 53 34 214 18 40 270 57 36	275 51 48 34 20 21 90 58 44	Liumchen..... McGuire..... Balan.....	2,893.8 4,819.8 1,824.8	3.461475 3.683025 3.261218

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Camas.....	49 00 57.54 121 45 21.31	43 25 49 45 43 36 76 07 44 150 09 12	223 20 07 225 42 20 256 03 33 330 08 29	Church..... Balan..... Liumchen..... McGuire.....	13,394.4 2,862.8 6,955.6 2,320.3	4.126924 3.456796 3.842333 3.365543
Mon. 50.....	48 59 50.85 121 45 29.87	166 27 30 184 49 35	346 26 54 4 49 42	McGuire..... Camas.....	4,189.1 2,067.5	3.622118 3.315435
Mon. 51.....	48 59 50.84 121 44 58.03	90 02 00 167 04 19	270 01 36 347 04 02	Mon. 50..... Camas.....	647.2 2,114.1	2.811017 3.325119
Mon. 52.....	48 59 50.85 121 44 23.26	90 00 57 91 06 24 150 12 38	270 00 06 271 04 24 330 11 54	Mon. 50..... Balan..... Camas.....	1,354.0 3,230.4 2,374.2	3.131616 3.509257 3.375515
Slesse.....	49 03 10.63 121 37 27.11	79 02 31 120 08 18	258 55 50 300 01 50	McGuire..... Thurston.....	10,987.1 12,015.4	4.040882 4.079738
Mon. 53.....	48 59 54.33 121 39 59.46	63 47 05 88 52 38 89 07 04 89 44 10 91 16 46 106 39 19 117 18 02 207 01 24	243 37 21 268 49 19 259 02 55 269 38 51 271 08 32 286 35 16 297 13 16 27 03 19	Church..... Mon. 52..... Mon. 50..... Balan..... Liumchen..... Camas..... McGuire..... Slesse.....	17,566.5 5,363.3 6,717.1 8,592.2 13,297.9 6,826.2 8,656.5 6,808.2	4.244684 3.729436 3.827182 3.934102 4.123782 3.834182 3.937341 3.833034
Red.....	48 58 45.80 121 38 48.35	71 51 24 91 36 58 99 18 53 117 02 25 123 41 02 191 23 56	251 40 47 271 20 10 279 09 46 296 57 28 303 35 23 11 24 58	Church..... Black..... Liumchen..... Camas..... McGuire..... Slesse.....	18,107.3 27,173.9 14,936.8 8,964.7 10,980.1 8,346.0	4.257853 4.434152 4.174258 3.952536 4.040605 3.921481
Silver.....	49 07 47.11 121 30 14.05	32 02 13 45 51 23 61 33 42 82 36 59 312 29 33	211 55 44 225 45 56 241 21 34 262 25 04 132 41 33	Red..... Slesse..... McGuire..... Thurston..... Glacier.....	19,714.8 12,253.5 22,270.5 19,334.9 26,278.5	4.294792 4.088261 4.347730 4.286343 4.419600
Mon. 54.....	48 59 56.15 121 37 44.01	31 02 56 183 16 09	211 02 07 3 16 22	Red..... Slesse.....	2,536.6 6,017.7	3.404244 3.779429
D.....	49 01 00.37 121 35 01.11	48 02 16 59 05 13 143 37 34 204 50 45	227 59 24 239 03 10 323 35 44 24 54 22	Red..... Mon. 54..... Slesse..... Silver.....	6,214.3 3,859.6 4,998.8 13,850.1	3.793394 3.586539 3.698868 4.141454
E.....	49 00 02.07 121 33 57.21	68 19 28 87 45 08 144 12 48	248 15 49 267 42 17 324 12 00	Red..... Mon. 54..... D.....	6,370.7 4,613.7 2,220.3	3.804184 3.664046 3.346406
North.....	49 00 51.14 121 35 58.66	256 17 21 301 32 35	76 18 04 121 34 07	D..... E.....	1,203.6 2,896.4	3.080488 3.461860
South.....	49 00 17.74 121 35 12.44	137 41 21 189 54 54 287 33 40	317 40 46 9 55 03 107 34 37	North..... D..... E.....	1,395.2 1,336.8 1,603.8	3.144636 3.126069 3.205140
Power.....	48 59 55.18 121 36 36.66	204 04 25 223 57 00 247 50 26	24 04 54 43 58 12 67 51 29	North..... D..... South.....	1,893.3 2,797.5 1,848.3	3.277219 3.446776 3.266777
Mon. 55.....	48 59 56.88 121 36 42.19	294 58 49	114 58 53	Power.....	123.90	2.093294
Mon. 56.....	48 59 57.93 121 33 56.42	69 27 11 89 20 38	249 23 31 269 17 46	Red..... Mon. 54.....	6,339.6 4,626.5	3.802060 3.665252
F.....	48 59 55.73 121 32 35.89	74 07 02 92 23 15 96 46 08 124 05 52	254 02 21 272 22 14 276 45 06 304 04 02	Red..... Mon. 56..... E..... D.....	7,874.5 1,638.4 1,664.6 3,563.4	3.896224 3.214415 3.221310 3.551866
G.....	49 01 13.90 121 31 05.65	37 13 13 57 32 38 85 01 57 114 59 57	217 12 09 237 30 29 264 58 59 294 55 09	F..... E..... D..... Slesse.....	3,032.1 4,132.6 4,802.3 8,546.0	3.481747 3.616218 3.681450 3.931763
Cope.....	49 00 01.84 121 29 48.71	86 50 06 144 55 07	266 47 59 324 54 09	F..... G.....	3,403.4 2,720.2	3.531916 3.434605
Mon. 57.....	48 59 58.80 121 31 32.65	193 18 10 267 25 17	13 18 30 87 27 35	G..... Cope.....	2,384.0 2,114.9	3.377300 3.325295
Mon. 58.....	48 59 58.82 121 31 20.01	89 50 15 187 10 05	269 50 06 7 10 16	Mon. 57..... G.....	257.0 2,337.5	2.406891 3.368755
Middle.....	48 59 43.92 121 28 33.99	81 53 05 94 16 06 106 44 57 110 02 26 120 34 43 132 03 37 172 15 39 279 16 17	261 45 22 274 13 03 286 40 05 290 01 29 300 28 00 312 01 43 352 14 24 99 27 01	Red..... F..... D..... Cope..... Slesse..... G..... Silver..... Glacier.....	12,619.1 4,930.6 8,214.4 1,616.5 12,573.4 4,150.4 15,064.4 17,571.2	4.101028 3.692900 3.914578 3.208580 4.099452 3.618095 4.177951 4.244802

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 59.....	48 59 59.23 121 29 45.72	88 13 40 89 39 39 287 57 40	268 11 31 269 38 19 107 58 34	F..... Mon. 57..... Middle.....	3,460.5 2,173.5 1,532.9	3.539135 3.337154 3.185514
J.....	49 02 15.70 121 27 41.13	12 54 32 54 12 08 65 20 29 75 27 09 98 10 37 163 09 13	192 53 52 234 08 26 245 17 54 255 21 37 278 03 14 343 07 17	Middle..... F..... G..... D..... Slesse..... Silver.....	4,810.3 7,387.0 4,572.5 9,236.3 12,020.4 10,697.9	3.682174 3.868467 3.660156 3.965496 4.079920 4.028300
H.....	49 00 27.50 121 28 10.08	19 51 02 65 48 47 68 26 04 111 54 13	199 50 44 245 47 35 248 24 49 291 52 01	Middle..... Mon. 59..... Cope..... G.....	1,431.5 2,131.2 2,155.6 3,844.8	3.155777 3.328624 3.333560 3.584878
Mon. 60.....	48 59 59.56 121 28 25.04	20 37 43 88 41 46 89 38 57 92 23 06 125 08 45	200 37 36 268 38 37 269 37 56 272 22 03 305 06 44	Middle..... F..... Mon. 59..... Cope..... G.....	516.3 5,100.1 1,640.0 1,702.0 3,990.8	2.712880 3.707580 3.214838 3.230855 3.601063
Mon. 61.....	48 59 59.98 121 26 37.59	78 10 14 114 21 02	258 08 46 294 19 52	Middle..... H.....	2,417.5 2,063.1	3.383358 3.314523
L.....	49 01 46.72 121 20 34.47	68 46 44 95 56 34 133 29 17	248 40 42 275 51 12 313 21 59	Middle..... J..... Silver.....	10,456.7 8,712.5 16,195.4	4.019396 3.940145 4.206391
M.....	48 59 13.94 121 21 52.64	96 31 02 128 26 48 198 35 39	276 25 59 308 22 25 18 36 38	Middle..... J..... L.....	8,211.8 9,037.6 4,979.8	3.914438 3.956052 3.697212
K.....	49 01 20.44 121 25 45.79	126 05 18 262 39 15 309 29 15	306 03 51 82 43 10 129 32 11	J..... L..... M.....	2,898.8 6,376.5 6,142.3	3.462215 3.804585 3.788326
File.....	49 00 25.42 121 23 02.62	79 15 25 117 09 33 121 04 49 230 08 46 327 12 02	259 11 15 297 07 30 301 01 18 50 10 38 147 12 55	Middle..... K..... J..... L..... M.....	6,856.2 3,725.9 6,604.8 3,920.3 2,626.8	3.836085 3.571236 3.819858 3.593324 3.419422
Mon. 64.....	49 00 01.70 121 22 39.72	85 40 34 89 23 45 122 46 30 124 05 20 147 34 58	265 36 07 269 20 46 302 44 10 304 01 33 327 34 41	Middle..... Mon. 61..... K..... J..... File.....	7,222.2 4,835.3 4,496.2 7,392.0 868.3	3.858068 3.684427 3.652848 3.868761 2.938650
Mon. 62.....	49 00 00.35 121 24 52.24	269 06 10 291 25 10	89 07 50 111 27 26	Mon. 64..... M.....	2,694.0 3,922.6	3.430398 3.593573
Mon. 63.....	49 00 00.37 121 24 13.88	89 58 06 142 57 15	269 57 37 322 56 06	Mon. 62..... K.....	779.8 3,099.7	2.891990 3.491320
N.....	48 59 22.11 121 20 21.86	82 13 23 120 55 04 176 43 04	262 12 14 300 53 02 356 42 55	M..... File..... L.....	1,862.7 3,808.4 4,474.6	3.270153 3.580740 3.650756
Mon. 65.....	49 00 03.84 121 20 00.94	18 15 16 55 50 12 100 15 06	198 15 00 235 48 48 280 12 49	N..... M..... File.....	1,357.5 2,744.4 3,752.2	3.132754 3.438454 3.574287
O.....	49 00 22.02 121 18 12.46	54 53 01 64 51 19	234 51 23 244 48 33	N..... M.....	3,216.0 4,945.0	3.507319 3.694166
Mon. 67.....	49 00 03.78 121 17 46.81	67 48 09 72 54 12 137 13 14	247 46 12 252 51 07 317 12 55	N..... M..... O.....	3,404.6 5,229.1 767.7	3.532066 3.718426 2.885206
Mon. 66.....	49 00 03.76 121 18 01.61	269 52 35	89 52 46	Mon. 67.....	300.90	2.478426
Whitworth.....	49 04 04.13 121 13 05.36	8 04 17 65 05 14 67 01 01 108 22 32 269 52 54 302 00 04	188 03 20 244 59 35 246 49 20 288 09 35 90 02 06 122 09 28	Glacier..... L..... Middle..... Silver..... Lightning..... Hozomeen.....	11,005.2 10,059.3 20,504.8 21,975.5 14,829.5 17,900.2	4.041598 4.002568 4.311856 4.341939 4.171125 4.252858
Mon. 68.....	49 00 03.33 121 14 59.84	79 01 36 79 44 21 98 24 32 115 11 45 197 20 48	258 57 33 259 39 10 278 22 07 295 07 32 17 22 14	N..... M..... O..... L..... Whitworth.....	6,668.8 8,529.2 3,957.4 7,512.5 7,793.8	3.824047 3.930907 3.597414 3.876786 3.891750
P.....	49 00 51.48 121 13 29.16	51 06 01 73 38 47 101 12 56 184 38 25 248 39 26	231 04 53 253 32 27 281 07 35 4 38 43 68 48 56	Mon. 68..... M..... L..... Whitworth..... Lightning.....	2,368.4 10,668.0 8,808.1 5,970.9 16,439.9	3.374448 4.028085 3.944882 3.776041 4.215890
Q.....	49 01 47.25 121 12 00.22	46 22 30 162 38 09 252 30 43	226 21 22 342 37 20 72 39 06	P..... Whitworth..... Lightning.....	2,496.6 4,430.6 14,161.7	3.397356 3.646460 4.151116

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 69.....	49 00 02.61 121 11 34.82	123 01 24 166 09 43 170 55 47	302 59 58 346 08 35 350 55 28	P..... Whitworth..... Q.....	2,771.1 7,684.4 3,273.5	3.442659 3.885009 3.515013
Mon. 70.....	49 00 02.12 121 09 13.43	106 22 36 133 47 40 147 48 26	286 19 23 313 45 34 327 45 30	P..... Q..... Whitworth.....	5,416.2 4,663.9 8,836.5	3.733696 3.671532 3.946280
S.....	49 00 37.59 121 08 42.11	94 14 11 118 08 56 140 03 52 235 59 46	274 10 34 298 06 26 320 00 33 56 05 39	P..... Q..... Whitworth..... Lightning.....	5,848.9 4,564.3 8,324.4 11,442.5	3.767077 3.656375 3.920354 4.058519
T.....	48 58 27.93 121 03 57.64	124 44 14 199 38 39	304 40 40 19 40 57	S..... Lightning.....	7,034.7 11,040.3	3.847245 4.042983
Mon. 72.....	49 00 01.30 121 03 40.98	6 41 50 100 24 40	186 41 38 280 20 53	T..... S.....	2,904.3 6,221.8	3.463042 3.793918
Mon. 71.....	49 00 01.31 121 05 35.77	217 11 47 269 59 21 325 19 12	37 15 19 90 00 48 145 20 26	Lightning..... Mon. 72..... T.....	9,434.1 2,333.1 3,507.3	3.974702 3.367936 3.544970
Mon. 73.....	49 00 01.47 121 01 05.61	89 58 30 95 54 54 96 54 20 117 13 18 181 40 34	269 55 06 275 45 33 276 48 36 297 04 14 1 40 42	Mon.-71..... P..... S..... Whitworth..... Lightning.....	5,491.2 15,189.9 9,344.6 16,429.5 7,510.1	3.739667 4.181555 3.970562 4.215624 3.875645
Brush.....	49 02 04.23 120 57 58.81	45 02 48 101 26 20 136 07 50 284 51 11	225 00 27 281 16 56 316 05 37 104 56 36	Mon. 73..... Whitworth..... Lightning..... Frosty West.....	5,365.3 18,776.7 5,154.5 9,051.9	3.729594 4.273619 3.712184 3.956742
Mon. 74.....	49 00 01.53 120 59 58.14	89 55 50 115 11 39 212 35 41	269 54 59 295 01 44 32 37 12	Mon. 73..... Whitworth..... Brush.....	1,371.5 17,659.3 4,499.4	3.137184 4.246973 3.653155
Rim.....	49 00 39.16 120 54 42.86	79 45 08 123 26 57 130 03 28 266 22 01	259 41 10 303 24 29 309 58 47 86 24 58	Mon. 74..... Brush..... Lightning..... Frosty West.....	6,512.3 4,770.3 9,863.7 4,777.2	3.813734 3.678546 3.994042 3.679174
Poley.....	48 59 33.10 121 00 38.67	177 45 52 214 48 52 223 10 01 254 12 23	357 45 40 34 50 52 43 10 32 74 16 52	Lightning..... Brush..... Mon. 74..... Rim.....	8,399.6 5,687.4 1,204.2 7,514.4	3.923743 3.754912 3.080681 3.875892
Lone Mountain.....	49 00 37.42 120 56 40.23	67 44 02 74 36 44 149 14 30 268 41 51	247 41 02 254 34 14 329 13 30 88 43 20	Poley..... Mon. 74..... Brush..... Rim.....	5,237.8 4,172.2 3,120.9 2,385.9	3.719146 3.620366 3.494281 3.377649
Mon. 76.....	49 00 01.65 120 54 33.54	90 00 04 113 14 07 170 43 02	269 55 59 293 12 32 350 42 55	Mon. 74..... Lone Mountain..... Rim.....	6,597.8 2,801.9 1,173.9	3.819399 3.447452 3.069621
Mon. 75.....	49 00 01.63 120 57 11.34	89 58 00 209 45 43 248 58 13 269 58 10	269 55 54 29 46 07 69 00 05 90 00 09	Mon. 74..... Lone Mountain..... Rim..... Mon. 76.....	3,390.3 1,273.6 3,232.8 3,207.5	3.530239 3.105028 3.509578 3.506165
Mon. 77.....	49 00 01.61 120 51 34.38	90 02 20 106 51 51 212 41 56 235 44 31	269 55 59 286 49 28 32 42 31 55 45 34	Mon. 74..... Rim..... Frosty West..... Frosty.....	10,239.4 4,002.3 1,735.6 2,051.4	4.010276 3.602314 3.239441 3.312043
Mon. 83.....	49 00 01.26 120 38 38.39	27 32 20 94 48 20 188 01 02 239 00 05 277 51 55 295 50 06	207 29 34 274 39 37 8 01 24 59 08 58 98 03 32 116 01 11	Smoky..... Frosty..... Roche..... Princeton..... Sheep..... Ashnola.....	9,711.0 14,123.6 4,190.9 16,716.0 18,969.7 19,941.0	3.987262 4.149946 3.622311 4.223133 4.278061 4.299746
Patrice.....	49 02 20.93 120 45 04.97	63 09 54 67 51 17 271 04 27 298 44 23 345 20 47	243 06 03 247 46 58 91 09 41 118 49 15 165 22 52	Frosty..... Frosty West..... Roche..... Mon. 83..... Smoky.....	6,968.5 7,531.0 8,437.7 8,961.5 13,360.6	3.843137 3.876855 3.926225 3.952382 4.125825
Mon. 79.....	49 00 01.31 120 45 37.36	90 06 44 101 51 07 188 40 20 269 57 55	270 02 14 281 47 40 8 40 44 90 03 11	Mon. 77..... Frosty..... Patrice..... Mon. 83.....	7,256.8 5,680.9 4,363.1 8,516.0	3.860744 3.754417 3.639794 3.930234
Mack.....	49 00 01.46 120 47 08.27	90 04 40 107 21 32 210 09 49 270 08 16	270 01 20 287 19 14 30 11 22 90 09 25	Mon. 77..... Frosty..... Patrice..... Mon. 79.....	5,409.0 3,889.5 4,983.8 1,847.8	3.733116 3.589898 3.697562 3.266655
Callahan.....	49 01 21.34 120 47 55.77	64 32 40 74 03 18 242 01 59 338 37 46	244 30 58 254 01 08 62 04 08 158 38 22	Frosty..... Frosty West..... Patrice..... Mack.....	3,042.4 3,644.9 3,927.7 2,649.7	3.483219 3.561688 3.594138 3.423191

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 78.....	49 00 01.48 120 48 03.20	183 30 04 270 00 55	3 30 10 90 01 37	Callahan..... Mack.....	2,471.8 1,116.5	3.393008 3.047878
Mon. 80.....	49 00 00.97 120 41 55.14	138 17 07 227 44 54 269 50 52	318 14 44 47 47 44 89 53 21	Patrice..... Roche..... Mon. 83.....	5,794.0 6,188.4 3,999.1	3.762981 3.791579 3.601966
Otness.....	49 00 22.55 120 40 06.09	73 16 13 121 05 24	253 14 51 301 01 38	Mon. 80..... Patrice.....	2,314.5 7,088.5	3.364454 3.850552
Mon. 82.....	49 00 00.86 120 40 06.02	90 05 44 125 29 46 179 52 38	270 04 22 305 26 01 359 52 38	Mon. 80..... Patrice..... Otness.....	2,218.0 7,457.7 609.9	3.345953 3.872004 2.827037
Mon. 81.....	49 00 00.85 120 41 00.08	238 34 46 269 59 01	58 35 27 89 59 42	Otness..... Mon. 82.....	1,285.7 1,098.7	3.109139 3.040893
Turret.....	48 58 55.68 120 51 38.94	90 10 16 209 15 40 225 12 25 231 34 53 249 42 09 269 58 23	270 03 28 29 16 47 45 15 14 51 39 50 69 45 34 120 05 25	Hozomeen..... Frosty..... Callahan..... Patrice..... Mack..... Smoky.....	10,977.1 3,658.5 6,389.3 10,212.9 5,866.0 13,160.3	4.040488 3.563302 3.805455 4.009150 3.768345 4.119266
Bunker Hill.....	48 58 49.43 120 29 18.06	101 04 52 120 34 42 195 17 53 273 07 29 314 48 12	280 57 50 300 28 01 15 19 43 93 12 03 134 52 14	Mon. 83..... Roche..... Princeton..... Sheep..... Ashnola.....	11,605.7 12,540.2 11,207.4 7,407.6 9,218.5	4.064671 4.098304 4.049504 3.869677 3.964660
Mon. 90.....	49 00 02.21 120 24 06.05	70 31 03 89 59 51 299 31 23 338 24 01 358 45 42	250 27 08 269 48 52 119 40 43 158 24 40 178 45 49	Bunker Hill..... Mon. 83..... Remmel..... Sheep..... Ashnola.....	6,729.6 17,731.0 17,353.5 2,857.3 8,750.0	3.827989 4.248734 4.239388 3.455957 3.942007
Nemo.....	49 01 24.09 120 37 01.35	37 37 59 138 56 17 243 56 02 296 51 10	217 36 45 318 55 26 64 03 42 116 57 00	Mon. 83..... Roche..... Princeton..... Bunker Hill.....	3,230.4 2,110.7 13,758.6 10,559.2	3.509255 3.324434 4.138575 4.023631
Ella.....	49 01 29.53 120 31 14.40	88 40 11 99 37 16 287 10 28 298 42 17 334 26 02	268 35 49 279 32 02 107 15 51 118 48 20 154 27 30	Nemo..... Roche..... Mon. 90..... Sheep..... Bunker Hill.....	7,050.7 8,553.5 9,112.9 11,130.4 5,482.0	3.848231 3.932146 3.959655 4.046509 3.739938
Mon. 87.....	49 00 02.52 120 31 25.25	89 47 32 110 17 08 116 37 29 184 41 16 270 01 01	269 42 05 290 12 54 296 32 23 4 41 24 90 06 32	Mon. 83..... Nemo..... Roche..... Ella..... Mon. 90.....	8,804.0 7,279.9 9,187.1 2,696.9 8,927.1	3.944682 3.862124 3.963177 3.430868 3.950708
Mon. 84.....	49 00 02.01 120 35 44.05	89 38 44 148 13 51 243 42 33 269 48 01	269 36 32 328 12 52 63 45 56 89 51 16	Mon. 83..... Nemo..... Ella..... Mon. 87.....	3,543.6 2,982.7 6,110.3 5,260.4	3.549449 3.474604 3.786064 3.721020
Mon. 85 ecc.....	49 00 02.54 120 33 41.68	228 03 46 269 59 41 292 49 16	48 05 37 90 01 24 112 52 34	Ella..... Mon. 87..... Bunker Hill.....	4,022.4 2,773.1 5,815.9	3.604489 3.442970 3.764615
Mon. 85.....	49 00 02.54 120 33 29.72	90 00 40	270 00 31	Mon. 85 ecc.....	243.24	2.389033
Mon. 86.....	49 00 02.53 120 33 01.83	90 01 01	270 00 40	Mon. 85.....	566.77	2.753409
Mon. 89.....	49 00 02.31 120 25 41.66	62 55 16 90 05 20 270 05 20 311 35 33	242 52 32 270 01 00 90 06 32 131 37 24	Bunker Hill..... Mon. 87..... Mon. 90..... Sheep.....	4,941.9 6,983.8 1,943.3 4,006.0	3.693898 3.844089 3.288539 3.602714
Mon. 88.....	49 00 02.46 120 28 51.17	13 37 25 90 03 10 104 15 28 109 59 01	193 37 04 270 01 13 284 09 18 289 52 00	Bunker Hill..... Mon. 87..... Nemo..... Roche.....	2,321.1 3,131.8 10,275.3 12,069.0	3.365700 3.495794 4.011793 4.081673
Mon. 93.....	49 00 01.44 120 16 56.21	71 07 54 90 11 58 323 22 56	251 03 08 270 06 34 143 26 52	Sheep..... Mon. 90..... Remmel.....	8,125.9 8,737.0 10,645.8	3.909873 3.941361 4.027178
Cathedral.....	48 59 21.27 120 11 15.88	4 31 28 84 37 52 100 12 18 199 37 34 292 53 04	184 31 06 264 28 50 280 08 01 19 38 55 113 02 56	Remmel..... Sheep..... Mon. 93..... Lake View..... Windy.....	7,330.2 14,674.4 7,028.7 6,462.5 17,353.3	3.865113 4.166561 3.846875 3.810398 4.239382
Walls.....	49 00 51.77 120 07 38.88	26 19 00 57 39 15 145 48 21 309 33 01	206 15 55 237 36 31 325 46 58 129 40 10	Remmel..... Cathedral..... Lake View..... Windy.....	11,268.7 5,222.0 3,979.2 15,005.6	4.051874 3.717841 3.599796 4.178252

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Bosek.....	49 00 38.42 120 12 15.32	74 19 51 78 42 57 265 46 13 333 06 34 356 16 10	254 11 33 258 39 25 85 49 42 153 07 19 176 16 34	Sheep..... Mon. 93..... Walls..... Cathedral..... Rommel.....	13,918.6 5,821.9 5,632.7 2,671.9 9,711.0	4.143594 3.765063 3.750718 3.426815 3.987263
Kay.....	49 00 46.84 120 20 39.01	38 03 14 71 52 36 271 24 16 287 11 11	218 01 17 251 50 00 91 30 36 107 13 59	Sheep..... Mon. 90..... Bosek..... Mon. 93.....	5,124.0 4,428.0 10,238.9 4,740.3	3.709613 3.646204 4.010255 3.675807
Check.....	49 00 01.72 120 18 42.64	64 28 03 90 09 49 120 31 30	244 24 38 270 05 45 300 30 02	Sheep..... Mon. 90..... Kay.....	6,122.9 6,573.7 2,745.3	3.786960 3.817809 3.438583
Mon. 91.....	49 00 01.90 120 20 46.94	90 09 10 186 37 12 270 06 48	270 06 40 6 37 18 90 08 22	Mon. 90..... Kay..... Check.....	4,047.1 1,397.6 2,526.5	3.607149 3.145383 3.402526
Mon. 92.....	49 00 01.76 120 19 27.44	133 45 51 270 03 40	313 44 57 90 04 14	Kay..... Check.....	2,013.9 910.6	3.304038 2.959323
Rambo.....	48 59 23.66 120 13 16.20	104 39 00 208 10 36 271 42 51	284 36 14 28 11 22 91 44 21	Mon. 93..... Bosek..... Cathedral.....	4,622.2 2,620.0 2,447.2	3.664851 3.418297 3.388670
Mon. 95.....	49 00 00.43 120 10 50.27	23 17 34 69 03 40 90 16 43 124 10 28 198 41 44 247 47 50	203 17 15 249 01 50 270 12 06 304 09 24 18 42 45 67 50 14	Cathedral..... Rambo..... Mon. 93..... Bosek..... Lake View..... Walls.....	1,317.1 3,176.7 7,438.3 2,089.3 5,148.7 4,200.4	3.119622 3.501972 3.871474 3.319998 3.711700 3.623293
Mon. 94.....	49 00 00.90 120 13 24.46	90 14 51 270 14 39 351 41 32	270 12 12 90 16 36 171 41 38	Mon. 93..... Mon. 95..... Rambo.....	4,304.1 3,134.2 1,162.5	3.633878 3.496133 3.065388
Mon. 104.....	48 59 59.36 119 56 10.04	17 08 33 222 18 36 292 46 25	197 07 02 42 21 42 112 53 19	Windy..... Snowy..... Chopaka.....	8,316.7 7,425.1 12,117.5	3.919949 3.870701 4.083412
Crawford.....	48 58 55.18 120 00 26.07	64 50 36 93 33 35 112 18 36 122 03 07 233 44 10 249 07 16 335 09 55	244 42 05 273 25 24 292 13 09 301 56 17 53 50 29 69 10 30 155 11 37	Rommel..... Cathedral..... Walls..... Lake View..... Snowy..... Mon. 104..... Windy.....	15,253.3 13,236.5 9,506.4 13,008.9 12,646.9 5,570.0 6,572.2	4.183365 4.121774 3.978017 4.114240 4.101984 3.745853 3.817709
Mon. 103.....	48 59 59.28 119 56 38.84	13 12 36 66 49 16 225 27 39 269 45 15	193 11 27 246 46 25 45 31 07 89 45 36	Windy..... Crawford..... Snowy..... Mon. 104.....	8,160.9 5,026.0 7,832.9 585.6	3.911737 3.701224 3.893925 2.767573
Mon. 102.....	48 59 58.88 119 58 45.22	46 11 03 235 56 21 269 42 57	226 09 47 56 01 24 89 44 33	Crawford..... Snowy..... Mon. 103.....	2,842.0 9,836.8 2,568.7	3.453627 3.992854 3.406718
Giles.....	49 00 27.16 120 01 36.00	95 55 29 284 06 23 333 24 50	275 50 55 104 08 32 153 25 42	Walls..... Mon. 102..... Crawford.....	7,413.4 3,579.4 3,177.3	3.870015 3.553810 3.502055
Mix.....	48 59 37.32 120 02 20.42	210 22 50 261 19 12 299 14 21	30 23 23 81 21 54 119 15 47	Giles..... Mon. 102..... Crawford.....	1,784.7 4,424.9 2,664.5	3.251577 3.645899 3.425615
Mon. 98.....	48 59 58.80 120 03 27.91	107 48 45 248 55 31 269 56 45 295 48 20	287 45 35 68 56 56 90 00 18 115 49 11	Walls..... Giles..... Mon. 102..... Mix.....	5,356.6 2,437.2 5,746.0 1,524.0	3.728891 3.386900 3.759369 3.182989
Mon. 96.....	48 59 59.96 120 08 27.77	90 18 07 211 49 43 264 13 28	270 16 20 31 50 20 84 18 39	Mon. 95..... Walls..... Giles.....	2,896.4 1,883.8 8,411.1	3.461853 3.275032 3.924851
Mon. 97.....	48 59 59.19 120 05 00.09	90 20 53 116 44 11 258 12 38 270 21 02	270 18 16 296 42 11 78 15 12 90 22 12	Mon. 96..... Walls..... Giles..... Mon. 98.....	4,221.4 3,612.9 4,237.0 1,573.8	3.625460 3.557861 3.627062 3.272714
Earle.....	49 00 07.03 120 02 42.65	245 19 49 272 57 31 308 37 28 333 46 32	65 20 40 93 00 30 128 39 11 153 46 49	Giles..... Mon. 102..... Crawford..... Mix.....	1,490.5 4,832.5 3,554.7 1,022.9	3.173325 3.684176 3.550799 3.009815
Mon. 99.....	48 59 58.47 120 02 09.91	18 06 08 111 40 36 217 51 45	198 06 00 291 40 11 37 52 10	Mix..... Earle..... Giles.....	687.2 716.0 1,122.8	2.837061 2.854928 3.050294
Mon. 100.....	48 59 58.50 120 01 23.43	60 33 17 89 57 05 99 18 15	240 32 34 269 56 30 279 17 15	Mix..... Mon. 99..... Earle.....	1,330.2 944.8 1,631.6	3.123921 2.975323 3.212606
Mon. 101.....	48 59 58.62 120 00 04.70	76 36 04 90 06 02 269 42 08	256 34 21 270 03 28 89 43 08	Mix..... Mon. 98..... Mon. 102.....	2,836.1 4,130.4 1,615.6	3.452719 3.615996 3.208345

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 106.....	49 00 00.20 119 50 30.02	89 49 10 100 45 47 317 59 56	269 44 54 340 44 36 138 02 34	Mon. 104..... Snowy..... Chopaka.....	6,911.3 5,786.0 6,359.9	3.839562 3.762380 3.803448
Manley.....	49 00 36.11 119 55 23.44	39 50 17 53 25 00 222 56 10 280 30 20	219 49 42 233 24 03 42 58 41 100 34 02	Mon. 104..... Mon. 103..... Snowy..... Mon. 106.....	1,478.4 1,908.7 5,948.4 6,065.9	3.169792 3.280732 3.774400 3.782892
Jordan.....	48 59 46.04 119 53 38.06	97 36 12 125 50 42 197 57 12 297 55 55	277 34 18 305 49 22 17 58 24 118 00 54	Mon. 104..... Manley..... Snowy..... Chopaka.....	3,116.7 2,642.1 6,202.6 9,146.4	3.493091 3.421956 3.792572 3.961252
Mon. 105.....	48 59 59.91 119 52 41.14	69 41 00 89 47 36 108 44 44	249 40 17 299 44 59 288 42 41	Jordan..... Mon. 104..... Manley.....	1,233.6 4,246.1 3,483.1	3.091190 3.627990 3.541961
Mon. 107.....	49 00 00.56 119 47 17.04	89 51 30 133 07 10 356 01 06	269 49 05 313 03 34 176 01 18	Mon. 106..... Snowy..... Chopaka.....	3,922.5 7,980.1 4,750.4	3.593560 3.902011 3.676729
Little Chopaka.....	48 56 07.71 119 44 42.22	24 54 26 144 40 03 255 38 51	204 46 02 324 34 30 75 44 33	Tiffany..... Snowy..... Similkameen.....	32,567.8 15,508.3 9,512.4	4.512788 4.190563 3.978290
Mon. 111.....	49 00 00.83 119 41 21.84	241 03 49 274 48 46 313 20 08	61 07 01 94 57 38 133 23 19	End..... Osoyoos..... Similkameen.....	5,905.9 14,381.2 7,065.2	3.771239 4.157794 3.849127
Mon. 113.....	49 00 00.80 119 38 04.59	90 02 03 202 07 44	269 59 34 22 08 27	Mon. 111..... End.....	4,009.2 3,083.3	3.603062 3.489016
Palmer.....	48 58 45.40 119 41 43.62	190 45 20 227 14 30 242 21 40	10 45 36 47 17 58 62 24 25	Mon. 111..... End..... Mon. 113.....	2,372.1 7,642.2 5,025.4	3.375135 3.883219 3.701108
Mon. 112.....	49 00 00.82 119 39 10.77	53 09 04 90 01 16 332 59 17	233 07 09 269 59 37 153 00 49	Palmer..... Mon. 111..... Similkameen.....	3,883.9 2,694.0 5,444.0	3.589270 3.425535 3.735921
Mon. 108.....	49 00 00.73 119 45 21.90	89 52 58 123 44 22 269 56 16 295 46 16 297 39 04	269 51 31 303 39 19 89 59 17 115 52 28 117 41 49	Mon. 107..... Snowy..... Mon. 111..... Similkameen..... Palmer.....	2,340.5 9,816.6 4,879.4 11,129.5 5,010.9	3.369309 3.991959 3.688308 4.046476 3.699915
Mon. 109.....	49 00 00.84 119 43 47.60	269 59 30 312 44 43	90 01 20 132 46 17	Mon. 111..... Palmer.....	2,962.8 3,433.1	3.471708 3.535690
Mon. 110.....	49 00 00.84 119 41 59.44	89 58 34 90 01 07 352 08 24	269 56 01 269 59 45 172 08 36	Mon. 108..... Mon. 109..... Palmer.....	4,115.1 2,198.6 2,352.6	3.614385 3.342140 3.371546
Mon. 114.....	49 00 00.81 119 34 46.48	30 54 59 90 02 48 280 58 45	210 53 11 269 57 50 101 02 39	Similkameen..... Mon. 111..... Osoyoos.....	5,652.7 8,036.2 6,409.9	3.752256 3.905048 3.806850
Mon. 115.....	49 00 00.82 119 31 20.18	90 03 56 257 45 51 300 15 24	269 56 22 77 53 44 120 16 42	Mon. 111..... Sidley..... Osoyoos.....	12,229.3 13,044.2 2,429.4	4.087403 4.115416 3.385496
Mon. 116.....	49 00 00.76 119 30 15.51	219 13 43 256 24 49 269 58 45 327 20 46	39 15 17 76 31 54 90 02 13 147 21 15	Osoyoos north base..... Sidley..... Mon. 118..... Osoyoos.....	4,009.2 11,763.2 5,616.0 1,452.4	3.603058 4.070525 3.749430 3.162078
Mon. 119.....	49 00 00.74 119 24 06.20	27 26 38 79 43 56 90 00 19 90 03 37	207 24 52 259 39 46 269 59 09 269 58 10	Osoyoos south base..... Osoyoos..... Mon. 118..... Mon. 115.....	6,190.0 6,834.0 1,890.5 8,821.1	3.791692 3.834677 3.276588 3.945523
Mon. 120.....	49 00 00.76 119 22 51.80	38 28 56 81 35 50 89 59 01 348 49 16	218 26 14 261 30 44 269 58 04 168 50 16	Osoyoos south base..... Osoyoos..... Mon. 119..... Hump.....	7,017.2 8,326.5 1,512.3 8,382.4	3.846164 3.920465 3.179627 3.923367
Mon. 121.....	49 00 00.73 119 20 24.85	9 26 01 53 16 21 83 50 43 168 23 12	189 25 11 233 11 48 263 43 46 348 22 51	Hump..... Osoyoos south base..... Osoyoos..... Sidley.....	8,335.0 9,178.4 11,289.7 2,810.2	3.920907 3.962789 4.052684 3.448737
Molson (U. S. G. S.).....	48 59 46.93 119 09 41.15	19 24 46 146 04 13 295 16 20	199 23 28 326 02 33 115 19 48	Balsam..... Gillespie..... Bolster.....	6,290.0 4,836.0 6,194.2	3.798648 3.684484 3.791982
Taylor.....	49 01 07.11 119 06 06.96	60 09 04 102 23 12 255 43 40 308 34 12 345 54 44	240 06 24 282 18 51 75 48 26 128 39 38 165 55 32	Molson..... Gillespie..... Tippie..... Copper..... Bolster.....	4,973.1 7,176.6 7,948.6 11,290.6 5,282.8	3.696626 3.855920 3.900291 4.051500 3.722866
Mon. 122.....	49 00 00.72 119 18 36.76	23 27 06 246 17 43 272 11 07	203 24 54 66 22 47 92 17 51	Hump..... Gillespie..... Molson.....	8,961.4 8,934.3 10,895.6	3.952378 3.951059 4.037251



## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 123.....	49 00 00.68 119 15 51.91	90 02 34 114 17 19 233 23 37	270 00 29 294 13 32 53 26 37	Mon. 122..... Sidley..... Gillespie.....	3,350.7 6,704.1 6,019.2	3.525140 3.826341 3.779538
Mon. 124.....	49 00 00.67 119 13 22.66	90 02 55 106 48 34 206 38 41	269 58 58 286 42 54 26 39 48	Mon. 122..... Sidley..... Gillespie.....	6,384.5 9,551.0 4,014.1	3.805124 3.980050 3.603585
Gill.....	49 00 18.14 119 11 02.67	161 06 04 300 11 12	341 05 25 120 12 13	Gillespie..... Molson.....	3,221.5 1,917.0	3.508053 3.282631
Bride.....	49 01 04.14 119 10 22.60	29 49 04 131 12 52 340 32 46	209 48 33 311 11 43 160 33 17	Gill..... Gillespie..... Molson.....	1,637.9 2,469.2 2,529.7	3.214291 3.392550 3.403061
Son.....	49 00 00.68 119 09 50.76	110 15 46 145 05 08 161 44 25	290 14 52 325 03 35 341 44 01	Gill..... Gillespie..... Bride.....	1,557.9 4,375.1 2,064.5	3.192528 3.640986 3.314806
Mon. 125.....	49 00 00.67 119 11 41.54	269 58 50 279 49 45 356 45 58	90 00 14 99 51 16 176 46 11	Son..... Molson..... Balsam.....	2,251.6 2,483.6 6,367.4	3.352498 3.395088 3.803904
Mon. 126.....	49 00 00.88 119 10 55.32	164 21 04 198 47 14 270 15 24	344 20 58 18 47 39 90 16 13	Gill..... Bride..... Son.....	553.8 2,064.5 1,312.2	2.743379 3.314808 3.117999
Mon. 127.....	49 00 00.68 119 09 22.94	139 27 22 242 28 52 300 24 15	319 25 28 62 31 18 120 27 29	Gillespie..... Taylor..... Bolster.....	4,721.5 4,444.3 6,065.1	3.674084 3.647808 3.782840
Penny.....	49 00 06.04 119 07 38.56	76 41 10 85 33 01 316 09 41	256 39 38 265 31 42 136 11 37	Molson..... Mon. 127..... Bolster.....	2,560.9 2,128.2 4,487.3	3.408395 3.328020 3.651985
Mon. 128.....	49 00 00.70 119 07 39.53	80 14 51 89 59 32 186 52 28	260 13 19 269 58 14 6 52 29	Molson..... Mon. 127..... Penny.....	2,508.5 2,101.9 166.0	3.399407 3.322622 2.220185
Hurst.....	48 59 53.74 119 06 00.03	175 25 27 298 52 22 338 52 14	355 25 20 118 57 41 158 52 55	Taylor..... Copper..... Bolster.....	2,273.7 9,846.4 3,063.5	3.356728 3.993277 3.486222
Mon. 130.....	49 00 00.68 119 04 23.30	15 41 30 83 47 09 306 45 51	195 40 58 263 45 56 126 49 58	Bolster..... Hurst..... Copper.....	3,191.0 1,978.0 8,306.5	3.503925 3.296220 3.919419
Mon. 129.....	49 00 00.71 119 06 00.55	90 00 23 270 01 03 357 10 54	269 57 51 90 02 16 177 10 54	Mon. 127..... Mon. 130..... Hurst.....	4,113.8 1,976.9 215.7	3.614245 3.295980 2.333777
Myncester.....	49 01 02.14 119 01 16.03	43 14 04 219 45 16 337 31 00	223 11 11 39 46 21 157 32 46	Bolster..... Tippie..... Copper.....	6,819.8 2,742.0 7,438.7	3.833772 3.438071 3.871498
Mon. 131.....	49 00 00.65 119 02 45.45	86 55 52 90 02 19 221 41 15 223 43 24	266 53 25 270 01 05 41 43 28 43 44 32	Hurst..... Mon. 130..... Tippie..... Myncester.....	3,960.9 1,968.8 5,367.5 2,628.7	3.597794 3.298591 3.729771 3.419744
Mon. 133.....	49 00 00.69 118 58 22.46	7 51 21 69 30 02 88 43 32 102 15 38	187 50 56 249 24 57 268 37 47 282 09 46	Copper..... Bolster..... Hurst..... Taylor.....	5,023.0 8,755.9 9,303.3 9,699.8	3.700960 3.942302 3.968037 3.986764
Mon. 132.....	49 00 00.66 119 00 56.64	168 16 44 198 44 37 269 58 08	348 16 29 18 45 28 90 00 05	Myncester..... Tippie..... Mon. 133.....	1,939.4 4,231.3 3,133.9	3.287676 3.626476 3.496088
Rock.....	49 01 12.86 118 52 23.37	262 19 18 305 01 52	82 23 36 125 05 22	Midway..... Knob.....	7,012.1 6,919.0	3.845850 3.840043
Johnny.....	49 00 03.40 118 57 20.60	142 20 00 250 24 46 256 36 09	322 18 07 70 28 30 76 44 12	Tippie..... Rock..... Midway.....	4,955.9 6,410.1 13,350.7	3.695122 3.806863 4.125503
Mon. 134.....	49 00 00.71 118 57 21.60	193 40 30 249 46 35	13 40 31 69 50 20	Johnny..... Rock.....	85.74 6,457.5	1.933184 3.810065
Mon. 144.....	49 00 00.67 118 44 46.24	64 20 29 143 32 28	244 18 14 323 31 01	Knob..... Midway.....	4,026.0 3,932.8	3.604871 3.594706
Mon. 141.....	49 00 00.71 118 47 10.84	109 22 12 190 45 08 270 00 32	269 18 16 10 45 30 90 02 21	Rock..... Midway..... Mon. 144.....	6,731.0 3,217.9 2,639.1	3.828079 3.507574 3.468211
Frank.....	49 00 00.64 118 49 02.82	118 43 07 222 15 34	298 40 36 42 17 21	Rock..... Midway.....	4,646.2 4,275.5	3.667101 3.630991
Mon. 138.....	49 00 00.66 118 52 43.94	190 36 36 246 43 54 269 59 03	10 36 52 66 48 28 90 01 50	Rock..... Midway..... Frank.....	2,269.3 8,019.3 4,494.3	3.355890 3.904135 3.652965

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Irene.....	49 01 25.77 118 50 06.17	50 39 43 81 52 29 262 40 11 333 54 42	230 37 44 261 50 45 82 42 45 153 55 30	Mon. 138..... Rock..... Midway..... Frank.....	4, 146. 2 2, 815. 9 4, 196. 4 2, 927. 9	3. 617651 3. 449619 3. 622875 3. 466559
Midway astronomic station.....	49 00 41. 18 118 47 06. 71	98 40 53 110 42 42 195 07 04	278 36 54 290 40 26 15 07 23	Rock..... Irene..... Midway.....	6, 508. 6 3, 898. 0 1, 979. 8	3. 813486 3. 590844 3. 296619
Midway azimuth station.....	49 00 00. 67 118 45 49. 06	118 44 12 161 27 25	296 40 58 341 26 46	Irene..... Midway.....	5, 848. 8 3, 336. 0	3. 767068 3. 523227
Mon. 137.....	49 00 00. 74 118 53 53. 34	219 22 02 240 20 19 270 06 04	39 23 10 60 23 11 90 06 56	Rock..... Irene..... Mon. 138.....	2, 882. 1 5, 311. 3 1, 410. 8	3. 459703 3. 725203 3. 149463
Mon. 136.....	49 00 00. 70 118 54 32. 76	229 41 50 244 05 46 269 54 22	49 43 28 64 09 07 89 54 51	Rock..... Irene..... Mon. 137.....	3, 447. 1 6, 021. 1 801. 2	3. 537455 3. 779676 2. 903720
Mon. 135.....	49 00 00. 70 118 56 29. 36	245 56 28 251 18 42 269 59 06	65 59 34 71 23 32 90 00 34	Rock..... Irene..... Mon. 136.....	5, 473. 5 8, 218. 4 2, 370. 1	3. 738268 3. 914788 3. 374765
Mon. 139.....	49 00 00. 68 118 49 59. 51	127 20 55 231 50 35 270 03 14	307 19 06 51 53 04 90 03 56	Rock..... Midway..... Frank.....	3, 676. 9 5, 121. 0 1, 152. 2	3. 565480 3. 709359 3. 061524
Mon. 140.....	49 00 00. 67 118 48 07. 41	90 01 29 113 13 56 137 27 27 208 56 52	269 58 00 293 10 43 317 25 57 28 57 57	Mon. 138..... Rock..... Irene..... Midway.....	5, 620. 8 5, 659. 6 3, 568. 6 3, 614. 5	3. 749797 3. 752786 3. 552500 3. 558043
Mon. 143.....	49 00 00. 68 118 45 30. 72	90 02 10 115 10 55 155 36 49	270 00 54 295 07 27 335 35 56	Mon. 141..... Irene..... Midway.....	2, 035. 1 6, 184. 0 3, 472. 3	3. 308596 3. 791269 3. 540613
Mon. 142.....	49 00 00. 68 118 46 33. 17	177 00 59 269 59 49 269 59 58	357 00 53 90 00 36 90 01 19	Midway..... Mon. 143..... Mon. 144.....	3, 166. 5 1, 269. 6 2, 173. 5	3. 500581 3. 103652 3. 337157
Mon. 145.....	49 00 00. 67 118 44 01. 23	69 01 13 90 02 24 109 33 26 134 12 59	248 58 24 270 00 01 289 28 50 314 10 58	Knob..... Mon. 141..... Irene..... Midway.....	4, 866. 8 3, 854. 0 7, 868. 2 4, 636. 6	3. 687241 3. 585907 3. 895873 3. 656731
Mon. 146.....	49 00 00. 67 118 43 14. 35	72 25 17 90 02 28 107 28 58 126 58 13	252 21 53 269 59 30 287 23 47 306 55 37	Knob..... Mon. 141..... Irene..... Midway.....	5, 766. 6 4, 806. 8 8, 771. 8 5, 261. 6	3. 760920 3. 681858 3. 943090 3. 721120
Mon. 149.....	49 00 00. 65 118 39 52. 99	39 14 55 90 03 28 110 54 46	219 14 03 269 57 57 290 49 37	White..... Mon. 141..... Midway.....	2, 178. 9 8, 899. 8 8, 879. 3	3. 338236 3. 949379 3. 948378
Mon. 147.....	49 00 00. 65 118 42 21. 72	90 03 00 120 58 52 269 58 51	269 59 22 300 55 36 90 00 43	Mon. 141..... Midway..... Mon. 149.....	5, 876. 6 6, 150. 3 3, 023. 2	3. 769126 3. 788999 3. 480463
Mon. 148.....	49 00 00. 61 118 41 17. 46	90 21 13 115 43 03 269 50 45	270 09 06 295 38 59 89 57 49	Johnny..... Midway..... Mon. 149.....	19, 577. 0 7, 301. 7 1, 716. 9	4. 291745 3. 863424 3. 234753
Danville.....	49 00 04. 62 118 29 01. 39	140 29 58 153 29 39 214 17 43	320 28 22 333 27 47 34 19 28	Hardy..... Eagle..... Grand Forks.....	4, 043. 7 6, 737. 8 5, 010. 9	3. 606780 3. 828520 3. 699917
Mon. 152.....	49 00 00. 62 118 33 00. 07	196 38 32 215 03 48 268 31 00	16 39 40 35 05 13 88 34 00	Eagle..... Hardy..... Danville.....	6, 421. 6 3, 962. 7 4, 853. 0	3. 807642 3. 597996 3. 686012
Mon. 151.....	49 00 00. 64 118 35 14. 26	216 33 38 269 01 52 269 59 47	36 36 28 89 06 33 90 01 28	Eagle..... Danville..... Mon. 152.....	7, 661. 2 7, 579. 9 2, 727. 5	3. 884296 3. 879664 3. 435762
Mon. 150.....	49 00 00. 64 118 38 12. 01	34 22 33 63 50 09 269 58 53	214 22 03 243 48 02 90 01 08	Fir..... White..... Mon. 151.....	1, 440. 1 3, 823. 5 3, 612. 9	3. 158396 3. 582456 3. 557858
Mon. 153.....	49 00 00. 64 118 31 31. 94	89 59 38 188 31 37 267 40 55	269 58 32 8 31 55 87 42 49	Mon. 152..... Hardy..... Danville.....	1, 791. 4 3, 278. 9 3, 062. 5	3. 253192 3. 515728 3. 486082
Mon. 154.....	49 00 00. 64 118 30 13. 60	90 00 05 161 10 37 265 12 29	269 59 06 341 09 56 85 13 24	Mon. 153..... Hardy..... Danville.....	1, 592. 4 3, 425. 8 1, 472. 8	3. 202056 3. 534758 3. 168145
Carson azimuth station.....	49 00 00. 64 118 30 13. 80	161 14 33 268 31	341 13 52 88 31	Hardy..... Mon. 154.....	3, 424. 5 4. 11	3. 534603 0. 61384
Mon. 155.....	49 00 00. 64 118 29 33. 95	90 00 53 149 29 41 259 28 14	270 00 23 329 28 30 79 28 39	Mon. 154..... Hardy..... Danville.....	805. 8 3, 763. 9 673. 2	2. 906215 3. 575639 2. 828166

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 156.....	49 00 00.67 118 27 57.02	199 35 08 238 23 38	19 36 04 58 28 05	Grand Forks..... Gilpin.....	4,522.7 8,436.4	3.655401 3.926155
Mon. 159.....	49 00 00.52 118 23 18.86	90 04 32 135 54 37 199 09 07	270 01 02 315 52 03 19 10 05	Mon. 156..... Grand Forks..... Gilpin.....	5,653.9 5,940.8 4,680.5	3.752351 3.773844 3.670263
Mon. 157.....	49 00 00.70 118 27 06.24	89 57 37 186 29 28 234 18 57	269 56 58 8 29 46 54 22 46	Mon. 156..... Grand Forks..... Gilpin.....	1,032.2 4,287.5 7,576.1	3.013751 3.632209 3.879446
Mon. 158.....	49 00 00.62 118 25 18.21	90 02 48 158 08 52 221 51 22	270 00 48 338 07 48 41 53 49	Mon. 156..... Grand Forks..... Gilpin.....	3,228.1 4,592.8 5,934.0	3.508943 3.662078 3.773345
Mon. 160.....	49 00 00.61 118 22 34.07	89 49 53 188 03 45	269 49 19 8 04 09	Mon. 159..... Gilpin.....	910.4 4,462.6	2.959227 3.649591
Mon. 161.....	49 00 00.62 118 19 26.65	90 00 57 144 15 25 219 14 29	269 58 36 324 13 27 39 16 32	Mon. 160..... Gilpin..... Cascade.....	3,809.5 5,444.7 5,233.5	3.580863 3.735972 3.718793
Castle.....	49 01 19.28 118 09 32.30	59 41 06 100 32 09 252 01 51	239 35 48 280 26 43 72 06 55	Owl..... Cascade..... Buck.....	9,938.6 8,911.6 8,582.0	3.997327 3.949957 3.933588
Bowen.....	49 00 00.92 118 05 39.03	79 00 47 106 44 14 117 04 27 302 15 45	258 52 33 286 35 52 297 01 31 122 17 23	Owl..... Cascade..... Castle..... Horn.....	13,572.1 14,096.6 5,322.7 3,121.8	4.132648 4.149114 3.726132 3.494412
Mon. 162.....	49 00 00.55 118 17 08.49	90 03 29 187 05 33 255 15 12	270 01 45 7 05 51 75 20 57	Mon. 161..... Cascade..... Castle.....	2,808.2 4,085.7 9,584.2	3.448435 3.611269 3.981558
Mon. 163.....	49 00 00.59 118 14 48.05	89 59 28 149 55 06 249 13 09	269 57 42 329 53 39 69 17 07	Mon. 162..... Cascade..... Castle.....	2,854.7 4,684.7 6,861.5	3.455560 3.670886 3.836419
Otto.....	49 01 10.18 118 15 15.11	46 58 53 267 39 18 345 38 59	226 57 28 87 43 37 165 39 19	Mon. 162..... Castle..... Mon. 163.....	3,152.2 6,970.7 2,219.1	3.498618 3.843277 3.346173
Mon. 167.....	49 00 00.60 118 10 19.06	71 15 48 109 41 31 117 27 13	251 11 05 289 37 48 297 22 23	Owl..... Otto..... Cascade.....	8,055.6 6,388.7 8,802.9	3.906097 3.805412 3.944625
Mon. 164.....	49 00 00.62 118 13 45.37	139 41 33 244 41 01 269 59 04	319 40 25 64 44 12 90 01 40	Otto..... Castle..... Mon. 167.....	2,818.5 5,688.0 4,193.4	3.450020 3.754957 3.622568
Mon. 165.....	49 00 00.62 118 13 23.84	90 00 33 133 33 25 242 39 46	270 00 17 313 32 01 62 42 41	Mon. 164..... Otto..... Castle.....	437.57 3,119.5 5,295.7	2.641045 3.494084 3.723927
Mon. 166.....	49 00 00.61 118 12 23.27	90 01 19 121 37 53 235 00 37	270 00 33 301 35 43 55 02 46	Mon. 165..... Otto..... Castle.....	1,231.2 4,100.5 4,240.0	3.090318 3.612841 3.627371
Mon. 168.....	49 00 00.61 118 09 47.05	72 38 57 115 37 37 269 51 57	252 33 50 295 32 22 89 55 04	Owl..... Cascade..... Bowen.....	8,674.4 9,385.0 5,041.3	3.938241 3.972435 3.702543
Mon. 169.....	49 00 00.92 118 05 38.72	90 21	270 21	Bowen.....	6.26	0.79686
Baldy.....	48 55 42.24 117 27 32.23	85 57 28 120 29 02 185 54 47 187 49 21	265 38 59 300 16 04 5 56 18 7 51 07	Northport..... Lake..... Kelly..... Beaver.....	30,033.3 24,301.0 23,596.5 20,841.3	4.477603 4.385624 4.372847 4.318924
Mon. 174.....	49 00 01.82 117 53 34.90	248 22 30 349 40 06	68 29 11 169 41 15	Lake..... Northport.....	11,613.9 10,384.4	4.064978 4.016380
Sophia.....	49 00 29.11 117 52 51.11	46 34 10 250 52 26 354 59 03	226 33 37 70 58 34 174 59 39	Mon. 174..... Lake..... Northport.....	1,225.8 10,485.8 11,101.5	3.088413 4.020601 4.045382
Pete.....	48 59 37.04 117 51 15.75	129 41 52 237 41 18	309 40 40 57 46 14	Sophia..... Lake.....	2,518.6 9,430.6	3.401151 3.974541
Mon. 175.....	49 00 02.08 117 49 48.23	66 30 22 102 40 37	246 29 15 282 38 19	Pete..... Sophia.....	1,940.0 3,809.4	3.287805 3.580853
Mon. 176.....	49 00 02.21 117 46 20.38	34 20 42 82 39 14 89 58 09 96 00 53	214 16 23 262 35 31 269 52 41 275 55 58	Northport..... Pete..... Mon. 174..... Sophia.....	12,382.5 6,054.3 8,832.1 7,984.6	4.092809 3.782064 3.946063 3.902256
Churchill Lookout.....	48 58 00.55 118 02 06.45	250 08 16 297 44 06	70 14 42 117 51 41	Mon. 174..... Northport.....	11,055.4 13,873.1	4.043574 4.142173

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 170.....	49 00 01.07 118 03 41.08	89 54 00 259 21 38 269 49 41 305 36 41 332 39 40 351 46 23	269 52 31 79 35 57 89 57 18 125 45 27 152 40 51 171 46 32	Bowen..... Lake..... Mon. 174..... Northport..... Churchill Lookout..... Horn.....	2,397.4 23,512.2 12,321.2 17,474.1 4,190.9 1,689.1	3.379749 4.371294 4.090652 4.242594 3.622306 3.227667
Mon. 171.....	49 00 01.17 118 02 16.40	89 54 13 258 33 10 269 45 12 309 12 23 356 53 32	269 53 09 78 46 25 89 56 45 129 20 05 178 53 40	Mon. 170..... Lake..... Mon. 174..... Northport..... Churchill Lookout.....	1,721.2 21,822.2 10,600.0 16,108.1 3,731.8	3.235839 4.338900 4.025304 4.207045 3.571916
Mon. 172.....	49 00 01.41 117 59 27.61	40 52 40 89 53 49 89 54 40 256 30 03 269 51 36 318 25 27	220 50 40 269 51 42 269 51 28 78 41 11 89 56 02 138 31 02	Churchill Lookout..... Mon. 171..... Mon. 170..... Lake..... Mon. 174..... Northport.....	4,936.6 3,430.7 5,152.0 18,470.4 7,168.2 13,629.7	3.693426 3.535387 3.711973 4.266476 3.855472 4.134485
Cone.....	49 01 59.82 117 57 55.96	34 35 13 332 36 50	214 32 04 152 41 16	Churchill Lookout..... Northport.....	8,975.4 15,605.7	3.953055 4.193284
Velvet.....	49 00 33.42 117 54 37.97	62 39 55 123 35 02	242 34 17 303 32 33	Churchill Lookout..... Cone.....	10,268.5 4,827.4	4.011506 3.683713
Sheep Creek.....	49 00 16.37 117 57 33.87	52 54 00 172 00 35 261 35 53 327 44 36	232 50 34 352 00 18 81 38 05 147 48 46	Churchill Lookout..... Cone..... Velvet..... Northport.....	6,951.2 3,227.1 3,613.5 12,607.3	3.842059 3.508907 3.557930 4.100623
Mon. 173.....	49 00 01.70 117 55 55.61	102 47 50 146 11 02 238 08 37	282 46 36 326 09 31 58 09 36	Sheep Creek..... Cone..... Velvet.....	2,048.1 4,392.7 1,857.5	3.311340 3.642728 3.268928
Silver Crown.....	48 54 25.13 117 46 08.11	91 29 59 178 37 40	271 25 31 358 37 31	Northport..... Mon. 176.....	7,238.2 10,415.8	3.859634 4.017693
Mon. 177.....	49 00 02.46 117 44 11.68	12 49 04 43 12 22 89 50 22	192 47 36 223 06 26 269 48 44	Silver Crown..... Northport..... Mon. 176.....	10,686.6 14,031.8 2,615.8	4.028839 4.147114 3.417609
Melvin.....	48 59 32.70 117 36 33.88	63 52 21 117 30 53 225 34 43	243 40 40 297 24 43 45 43 18	Northport..... Lake..... Beaver.....	21,083.3 11,206.6 19,351.6	4.323939 4.049553 4.286716
Waneta.....	49 01 11.24 117 35 24.80	24 46 07 58 47 03 100 40 05 316 33 03	204 45 15 238 34 30 280 33 03 136 39 00	Melvin..... Northport..... Lake..... Baldy.....	3,352.1 23,778.3 11,543.4 13,987.4	3.525314 4.376180 4.062335 4.145739
Rail.....	49 00 02.95 117 37 04.89	223 56 50 325 59 32	43 58 06 145 59 56	Waneta..... Melvin.....	2,930.4 1,127.2	3.466928 3.051995
Mon. 181.....	49 00 02.95 117 37 35.38	231 30 17 269 59 37 306 46 02	51 31 56 90 00 00 126 46 48	Waneta..... Rail..... Melvin.....	3,390.0 619.8 1,590.8	3.530204 2.792245 3.193353
Mon. 180.....	49 00 02.95 117 38 11.04	238 00 02 269 59 22 269 59 31 295 18 27	58 02 08 90 00 12 89 59 58 115 19 41	Waneta..... Rail..... Mon. 181..... Melvin.....	3,982.9 1,344.5 724.7 2,184.9	3.600199 3.128573 2.860188 3.339430
Mon. 179.....	49 00 02.82 117 39 21.85	246 17 22 269 54 24 285 13 39	66 20 21 89 56 07 105 15 46	Waneta..... Rail..... Melvin.....	5,260.6 2,783.9 3,539.1	3.721037 3.444657 3.548891
Garden.....	48 59 13.53 117 36 22.04	53 17 54 65 36 40 112 38 10 119 32 42	233 10 32 245 24 50 292 35 55 299 26 24	Silver Crown..... Northport..... Mon. 179..... Lake.....	14,885.5 21,048.2 3,959.8 11,703.0	4.172764 4.323215 3.597678 4.068297
Columbia.....	49 03 26.11 117 33 16.94	25 45 10 43 15 26 49 46 10 54 18 23 81 44 27	205 42 51 223 05 45 229 41 34 234 04 13 261 35 49	Garden..... Silver Crown..... Mon. 179..... Northport..... Lake.....	8,661.6 22,916.3 9,715.3 28,245.2 14,086.8	3.937600 4.360145 3.987456 4.450944 4.148813
Mon. 178.....	49 00 02.70 117 41 46.92	139 49 40 238 42 29 269 54 24 282 55 02	319 47 27 58 48 54 89 56 14 102 59 08	Lake..... Columbia..... Mon. 179..... Garden.....	5,554.0 12,116.7 2,948.7 6,776.8	3.744602 4.083385 3.469630 3.831025
Mon. 182.....	49 00 02.82 117 34 45.00	52 20 48 90 01 06 90 01 50 109 17 06 195 53 26	232 19 35 269 55 48 269 58 21 289 09 35 15 54 33	Garden..... Mon. 178..... Mon. 179..... Lake..... Columbia.....	2,492.1 8,576.0 5,627.3 12,874.6 6,529.7	3.396561 3.933285 3.750299 4.106735 3.814894
Mon. 183.....	49 00 02.49 117 30 26.54	78 12 58 90 05 50 90 06 37 90 08 16 103 48 22 151 11 33	258 08 30 269 57 17 269 59 53 270 05 01 283 37 35 331 09 24	Garden..... Mon. 178..... Mon. 179..... Mon. 182..... Lake..... Columbia.....	7,383.5 13,829.4 10,880.7 5,253.5 17,919.3 7,179.7	3.868263 4.140904 4.036658 3.720445 4.253322 3.856103

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Red Top.....	48 57 55.44 117 33 14.32	120 20 32 122 18 22 179 42 04	300 11 52 302 16 01 359 42 02	Lake..... Garden..... Columbia.....	16, 215. 1 4, 515. 8 10, 214. 8	4. 209919 3. 654731 4. 009232
Mon. 184.....	49 00 01.96 117 25 41.17	15 44 13 67 03 43 90 11 28 124 18 26	195 42 49 246 58 01 270 07 52 304 12 42	Baldy..... Red Top..... Mon. 183..... Columbia.....	8, 335. 0 10, 008. 6 5, 800. 5 11, 202. 4	3. 920908 4. 000374 3. 763463 4. 049312
Hooknose.....	48 56 39.40 117 25 40.62	52 09 19 179 53 51 180 26 43	232 07 55 359 53 50 0 26 49	Baldy..... Mon. 184..... Kelly.....	2, 876. 9 6, 257. 6 21, 705. 5	3. 458930 3. 796405 4. 336570
Salmon Ridge.....	49 02 56.42 117 22 37.47	17 44 43 24 06 20	197 42 25 204 02 38	Hooknose..... Baldy.....	12, 227. 3 14, 690. 1	4. 087329 4. 167025
Mon. 189.....	48 59 59.95 117 17 20.50	58 42 21 130 16 53	238 36 04 310 12 54	Hooknose..... Salmon Ridge.....	11, 909. 4 8, 437. 2	4. 075892 3. 926199
Mon. 188.....	49 00 01.42 117 21 03.31	42 07 59 160 31 20	222 04 30 340 30 09	Hooknose..... Salmon Ridge.....	8, 411. 4 5, 734. 6	3. 924870 3. 758501
Nelson.....	49 02 33.81 117 22 15.38	20 52 59 26 54 18	200 50 24 206 50 19	Hooknose..... Baldy.....	11, 716. 4 14, 252. 8	4. 068793 4. 153901
Lomond.....	49 00 40.25 117 19 43.05	44 22 44 138 35 52	224 18 14 318 33 57	Hooknose..... Nelson.....	10, 403. 4 4, 677. 8	4. 017175 3. 670042
Crescent.....	48 58 52.10 117 19 22.00	62 00 55 105 40 54 152 47 47 172 42 18	241 56 09 285 36 08 332 45 36 352 42 02	Hooknose..... Mon. 184..... Nelson..... Lomond.....	8, 724. 6 8, 004. 9 7, 702. 1 3, 368. 5	3. 940744 3. 903357 3. 886611 3. 527431
Mon. 185.....	49 00 01.62 117 23 23.51	24 04 05 255 03 45 293 36 03	204 02 22 75 06 32 113 39 05	Hooknose..... Lomond..... Crescent.....	6, 841. 0 4, 636. 9 5, 359. 1	3. 835122 3. 666225 3. 729092
Mon. 186.....	49 00 01.40 117 22 03.67	90 15 03 177 06 36 247 12 17 303 03 42	270 14 02 357 06 27 67 14 03 123 05 44	Mon. 185..... Nelson..... Lomond..... Crescent.....	1, 622. 8 4, 714. 2 3, 099. 9 3, 922. 6	3. 210266 3. 673405 3. 491342 3. 593570
Mon. 187.....	49 00 01.42 117 21 13.87	270 02 02	90 02 10	Mon. 188.....	214. 6	2. 331684
Mon. 190.....	48 59 58.88 117 14 38.46	63 20 48 65 28 51 90 35 41 119 27 16 139 34 32	243 11 04 245 20 32 270 33 39 299 21 14 319 26 17	Baldy..... Hooknose..... Mon. 189..... Salmon Ridge..... Kelly.....	17, 622. 9 14, 809. 6 3, 283. 9 11, 170. 8 20, 437. 8	4. 246077 4. 170543 3. 517704 4. 048086 4. 310435
South Fork.....	48 57 40.34 117 09 08.80	80 53 15 84 46 28 119 38 17 122 35 26 134 53 23 254 17 18	260 39 23 264 33 59 299 28 24 302 31 18 314 41 00 74 24 51	Baldy..... Hooknose..... Nelson..... Mon. 190..... Kelly..... Snowy.....	22, 747. 7 20, 266. 6 18, 379. 0 7, 953. 1 28, 138. 1 12, 676. 1	4. 356937 4. 306780 4. 264323 3. 900538 4. 449295 4. 102987
Stags Leap.....	49 03 06.60 117 10 10.80	43 11 10 57 09 08 117 37 30 296 15 50 352 52 02	223 07 48 236 56 03 297 25 53 116 24 11 172 52 49	Mon. 190..... Baldy..... Kelly..... Snowy..... South Fork.....	7, 949. 8 25, 232. 8 21, 081. 3 15, 012. 8 10, 157. 4	3. 900353 4. 401966 4. 322899 4. 176463 4. 006780
Mawer.....	49 00 36.35 117 12 26.51	210 41 33 323 30 13	30 43 16 143 32 42	Stags Leap..... South Fork.....	5, 398. 5 6, 761. 9	3. 732273 3. 830069
Bab.....	49 01 30.65 117 10 23.46	56 09 15	236 07 42	Mawer.....	3, 010. 8	3. 478676
Mon. 191.....	48 59 57.76 117 11 57.30	153 31 56 213 35 42	333 31 34 33 36 53	Mawer..... Bab.....	1, 331. 8 3, 445. 4	3. 124436 3. 537242
Mon. 192.....	48 59 56.44 117 09 00.56	106 26 00 149 56 37 166 21 14	286 23 24 329 55 35 346 20 21	Mawer..... Bab..... Stags Leap.....	4, 363. 5 3, 362. 7 6, 045. 3	3. 639839 3. 526692 3. 781417
Dagon.....	49 00 50.41 117 07 12.74	21 54 19 52 44 38 86 08 05 107 48 13 139 19 57	201 52 51 232 43 17 266 04 08 287 45 49 319 17 42	South Fork..... Mon. 192..... Mawer..... Bab..... Stags Leap.....	6, 328. 2 2, 753. 5 6, 391. 0 4, 069. 6 5, 548. 1	3. 801278 3. 439888 3. 805566 3. 609552 3. 744147
Mundy.....	48 59 05.70 117 08 20.57	119 16 51 163 15 43 203 04 42	299 13 46 343 14 19 23 05 34	Mawer..... Stags Leap..... Dagon.....	5, 730. 1 7, 771. 6 3, 516. 4	3. 758159 3. 890510 3. 546093
Mon. 193.....	48 59 55.96 117 08 01.76	90 42 50 135 27 55 210 38 08	270 42 05 315 28 08 30 38 45	Mon. 192..... Bab..... Dagon.....	1, 195. 2 4, 104. 5 1, 955. 1	3. 077420 3. 613262 3. 291164

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Halma.....	48 58 41.07 117 06 29.22	59 59 01 108 35 05 137 45 31 140 53 23 151 15 40 167 31 19	239 57 01 288 33 41 317 42 34 320 52 13 331 12 52 347 30 46	South Fork..... Mundy..... Bab..... Mon. 193..... Stags Leap..... Dagon.....	3,748.8 2,388.4 7,078.7 2,981.9 9,357.1 4,092.3	3.573889 3.378114 3.849955 3.474490 3.971140 3.611964
Great Butte.....	49 01 41.78 117 04 44.80	20 49 40 35 45 48 62 11 05 69 57 39 77 53 21 87 10 27 111 37 32 300 33 13	200 48 22 215 42 29 242 09 13 249 52 13 257 47 32 267 06 12 291 33 26 120 37 27	Halma..... South Fork..... Dagon..... Mon. 191..... Mawer..... Bab..... Stags Leap..... Snowy.....	5,972.2 9,198.6 3,398.9 9,357.7 9,596.4 6,888.6 7,120.6 7,937.8	3.776134 3.963251 3.531335 3.971167 3.982108 3.838128 3.852518 3.899698
Mon. 194.....	48 59 56.85 117 04 17.79	277 12 07	97 16 00	Snowy.....	6,336.5	3.801848
Monk.....	49 03 16.49 117 00 50.98	44 18 19 58 23 12 88 31 11 343 21 15	224 12 03 238 20 16 268 24 08 163 22 33	South Fork..... Great Butte..... Stags Leap..... Snowy.....	14,497.8 5,577.6 11,370.8 7,269.3	4.161303 3.746444 4.055792 3.861490
Little Snowy.....	48 58 25.11 117 00 06.41	119 02 06 174 15 31 210 00 44	298 58 56 354 14 58 30 01 28	Mon. 194..... Monk..... Snowy.....	5,844.0 9,046.5 2,351.5	3.766712 3.956483 3.371343
Mon. 195.....	48 59 57.42 117 01 39.71	89 42 09 284 50 56 326 21 30	269 40 10 104 52 50 146 22 41	Mon. 194..... Snowy..... Little Snowy.....	3,213.2 3,179.0 3,424.9	3.506939 3.502294 3.534648
Mon. 196.....	48 59 57.87 116 59 24.16	16 41 35 89 43 45 89 43 48 339 03 50	196 41 03 269 42 02 269 40 07 159 04 02	Little Snowy..... Mon. 195..... Mon. 194..... Snowy.....	2,991.3 2,755.2 5,968.4 887.9	3.475864 3.440158 3.775861 2.948347
Continental.....	48 56 43.53 116 55 34.86	96 08 04 119 37 41 123 42 04 129 32 49 139 59 30 152 08 23	275 57 50 299 34 16 303 31 03 309 25 54 319 56 49 332 04 24	South Fork..... Little Snowy..... Stags Leap..... Great Butte..... Snowy..... Monk.....	16,652.3 6,353.2 21,378.8 14,488.1 6,757.4 13,734.9	4.221475 3.802990 4.329983 4.161011 3.829778 4.137825
Sack.....	49 01 09.62 116 58 09.53	21 30 13 97 05 37 140 05 46 339 02 50	201 29 29 277 00 38 320 03 44 159 04 47	Snowy..... Great Butte..... Monk..... Continental.....	3,273.6 8,091.7 5,110.1 8,801.1	3.515030 3.908040 3.708433 3.944537
Mon. 197.....	48 59 58.48 116 55 39.99	78 42 22 89 46 59 125 53 11	258 39 45 269 44 09 305 51 18	Snowy..... Mon. 196..... Sack.....	4,323.8 4,556.7 3,750.3	3.635864 3.658647 3.574063
Center.....	48 58 23.28 116 52 32.62	50 17 10 104 36 43 131 51 42	230 14 52 294 31 44 311 45 26	Continental..... Snowy..... Monk.....	4,820.8 8,318.3 13,586.7	3.683119 3.920033 4.133115
Parch.....	49 01 41.21 116 51 59.89	6 12 45 58 33 35 65 15 49 70 34 17 82 38 04 105 19 06	186 12 21 238 27 28 245 10 25 250 28 41 262 33 25 285 12 25	Center..... Little Snowy..... Snowy..... Mon. 196..... Sack..... Monk.....	6,150.5 11,597.0 9,595.0 9,578.8 7,573.0 11,180.5	3.788912 4.064345 3.982044 3.981173 3.879265 4.048463
Mon. 198.....	48 59 58.82 116 53 15.06	89 48 51 205 46 06 343 41 49	269 44 12 25 47 03 163 42 21	Mon. 196..... Parch..... Center.....	7,502.6 3,512.7 3,074.8	3.875209 3.545638 3.487823
Facer.....	49 01 21.78 116 46 53.60	51 22 11 95 32 34	231 17 55 275 28 43	Center..... Parch.....	8,825.7 6,251.3	3.945749 3.795973
Duff.....	49 01 11.17 116 45 20.46	59 29 18 96 33 56 99 49 57	239 23 52 276 28 55 279 48 47	Center..... Parch..... Facer.....	10,201.5 8,167.9 1,920.7	4.008666 3.912112 3.283451
Nupe.....	49 00 49.90 116 49 07.64	114 23 11 250 06 15 261 52 24	294 21 01 70 07 56 81 55 15	Parch..... Facer..... Duff.....	3,842.0 2,896.0 4,662.7	3.584558 3.461804 3.668640
Qua.....	48 59 40.27 116 48 58.88	135 27 58 175 16 20 219 03 39	315 25 41 355 16 13 39 05 13	Parch..... Nupe..... Facer.....	5,243.0 2,158.3 4,039.3	3.719578 3.334107 3.606302
Mon. 199.....	48 59 59.23 116 49 38.42	137 38 10 201 47 10 306 04 38	317 36 23 21 47 33 126 05 08	Parch..... Nupe..... Qua.....	4,264.8 1,685.6 994.5	3.629900 3.226765 2.997624
Mon. 200.....	48 59 59.46 116 47 15.02	124 15 31 189 42 29 226 24 32	304 14 06 9 42 45 46 25 59	Nupe..... Facer..... Duff.....	2,768.9 2,580.1 3,213.8	3.442307 3.411631 3.507017
Mon. 201.....	48 59 59.60 116 45 15.46	89 54 34 108 15 03 177 22 12	269 53 04 288 12 08 357 22 08	Mon. 200..... Nupe..... Duff.....	2,430.2 4,967.9 2,213.4	3.385644 3.696176 3.345061

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Saddle.....	48 57 01.74 116 46 11.42	87 15 01 106 20 51 108 02 13 123 01 04 173 54 38 187 39 14	267 07 56 286 11 05 287 57 26 302 50 01 353 54 06 7 39 52	Continental..... Snowy..... Center..... Monk..... Facer..... Duff.....	11,478.3 16,464.3 8,153.1 21,298.2 8,078.8 7,774.8	4.059876 4.216544 3.911320 4.328343 3.907346 3.890691
Wood.....	49 01 40.72 116 44 23.71	14 16 06 56 08 15 58 30 40 74 48 16 77 31 54 79 08 16 90 08 20 98 29 47	194 14 44 235 59 49 238 24 31 254 44 42 257 20 46 259 06 23 270 02 45 278 17 22	Saddle..... Continental..... Center..... Nupe..... Snowy..... Facer..... Parch..... Monk.....	8,892.2 16,446.5 11,660.0 5,978.6 18,422.9 3,101.0 9,267.2 20,268.0	3.949009 4.216075 4.066698 3.776602 4.265359 3.491498 3.966949 4.306811
Mon. 202.....	48 59 59.69 116 43 34.95	89 55 50 135 51 15 162 23 31	269 53 04 315 49 55 342 22 54	Mon. 200..... Duff..... Wood.....	4,473.2 3,077.9 3,274.6	3.650620 3.488261 3.515157
Mon. 204.....	48 59 59.81 116 39 02.96	57 46 45 89 59 20 106 04 17	237 41 21 269 55 54 285 59 32	Saddle..... Mon. 202..... Duff.....	10,304.6 5,528.5 7,982.0	4.013030 3.742808 3.902112
Kabe.....	48 59 59.62 116 43 31.02	134 50 11 269 54 27	314 48 48 89 57 49	Duff..... Mon. 204.....	3,135.8 5,448.6	3.496342 3.736284
Prox.....	49 00 00.26 116 41 55.33	89 25 24 117 44 38	269 24 12 297 42 04	Kabe..... Duff.....	1,944.9 4,709.1	3.288904 3.672935
Mon. 203.....	48 59 59.76 116 41 57.78	252 43 27	72 43 29	Prox.....	52.01	1.716046
Airy.....	48 57 32.73 116 37 29.61	84 54 03 121 28 01 121 43 48 125 13 50 130 10 24 132 20 49 157 20 10	264 47 29 301 23 25 301 39 16 305 07 55 310 07 03 312 15 37 337 19 00	Saddle..... Mon. 202..... Kabe..... Duff..... Prox..... Wood..... Mon. 204.....	10,659.1 8,706.2 8,636.9 11,711.9 7,068.6 11,382.1 4,924.1	4.027720 3.939628 3.936357 4.068626 3.849335 4.056222 3.692329
Extra.....	48 57 38.07 116 37 27.93	84 02 17 124 28 15 131 36 44 156 11 53	263 55 42 304 22 19 311 31 30 336 10 42	Saddle..... Duff..... Wood..... Mon. 204.....	10,709.0 11,645.6 11,297.1 4,786.0	4.029748 4.066162 4.052967 3.679970
Smith.....	48 55 23.070 116 35 49.259	103 35 58 138 10 09 152 59 45	283 28 09 318 03 41 332 58 29	Saddle..... Wood..... Airy.....	13,023.8 15,670.1 4,496.0	4.114738 4.195071 3.652824
Porthill.....	49 01 17.825 116 36 49.859	6 30 32 6 38 01 48 18 49 55 20 30 94 26 04 353 34 37.7	186 30 03 186 37 31 228 17 09 235 13 26 274 20 21 173 35 23.4	Extra..... Airy..... Mon. 204..... Saddle..... Wood..... Smith.....	6,832.5 7,000.3 3,622.7 13,860.5 9,247.5 11,028.0	3.834578 3.845116 3.559027 4.142717 3.966024 4.042496
Baun.....	49 00 58.90 116 36 43.01	8 22 48 57 19 23	188 22 14 237 17 38	Extra..... Mon. 204.....	6,270.8 3,379.6	3.797323 3.528960
Mon. 205.....	48 59 59.80 116 36 22.61	16 53 02 90 01 19 167 12 33	196 52 13 269 59 18 347 12 17	Extra..... Mon. 204..... Baun.....	4,575.3 3,259.3 1,872.1	3.660423 3.513123 3.272336
Mon. 207.....	48 59 59.77 116 29 53.45	40 17 38 105 56 52	220 13 10 285 51 38	Smith..... Porthill.....	11,200.4 8,799.0	4.049235 3.944435
Mon. 208.....	49 00 00.75 116 26 17.65	53 38 35 100 33 58	233 31 24 280 26 00	Smith..... Porthill.....	14,449.1 13,066.3	4.159842 4.116153
Mon. 209.....	49 00 01.35 116 23 44.81	59 49 07 89 39 54 98 30 19 254 36 21 308 11 34	239 40 01 269 35 15 278 20 26 74 41 27 128 19 33	Smith..... Mon. 207..... Porthill..... Hawkins..... Hell Roaring.....	17,060.6 7,493.0 16,127.4 8,548.1 16,447.5	4.231995 3.874658 4.207564 3.931871 4.216100
Hall.....	48 58 23.38 116 22 01.84	145 20 15 229 16 45 303 25 28	325 18 57 49 20 33 123 32 08	Mon. 209..... Hawkins..... Hell Roaring.....	3,680.2 8,113.6 12,975.8	3.565668 3.909211 4.113133
Shep.....	48 56 43.84 116 33 22.33	153 31 22 215 02 32 234 47 58 242 29 18	333 28 45 35 05 09 54 53 18 62 36 33	Porthill..... Mon. 207..... Mon. 208..... Mon. 209.....	9,457.3 7,394.5 10,563.7 13,235.3	3.975766 3.868911 4.023816 4.121733
Mon. 206.....	48 59 59.75 116 34 32.26	269 42 58 269 46 20 269 57 47 346 46 07	89 51 06 89 52 33 90 01 18 166 47 00	Mon. 209..... Mon. 208..... Mon. 207..... Shep.....	13,160.1 10,053.4 5,667.1 6,216.6	4.119258 4.002314 3.753362 3.793553
Hall Lookout.....	48 57 43.85 116 21 37.34	76 00 24 82 42 34 109 42 25 220 56 46 299 50 44	255 49 41 262 33 42 289 30 57 41 00 16 119 57 07	Smith..... Shep..... Porthill..... Hawkins..... Hell Roaring.....	17,873.4 14,462.3 19,093.5 8,623.5 11,910.5	4.252207 4.160238 4.294323 3.935683 4.075931

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mission.....	48 59 41.69 116 17 50.23	51 46 40 64 43 06 94 51 17 199 51 53 329 12 19	231 43 49 244 39 56 274 46 50 19 52 31 149 15 50	Hall Lookout..... Hall..... Mon. 209..... Hawkins..... Hell Roaring.....	5,880.3 5,659.0 7,233.2 3,052.2 11,145.7	3.769400 3.752738 3.859329 3.484619 4.047109
Mon. 210.....	49 00 02.01 116 20 49.22	12 55 03 25 51 46 89 41 42 244 20 39 279 46 06	192 54 27 205 50 51 269 39 30 64 23 33 99 48 22	Hall Lookout..... Hall..... Mon. 209..... Hawkins..... Mission.....	4,378.5 3,385.6 3,569.2 5,184.9 3,692.0	3.641322 3.529642 3.552570 3.714744 3.567264
Mon. 211.....	49 00 02.27 116 19 32.82	44 46 49 89 42 36 286 56 34	224 44 56 269 41 39 106 57 52	Hall..... Mon. 210..... Mission.....	4,302.5 1,552.9 2,180.0	3.633724 3.191157 3.338457
Harvey.....	48 59 33.52 116 17 07.13	96 06 44 106 04 02 182 57 36 332 37 08	276 01 44 286 03 29 2 57 42 152 40 07	Mon. 209..... Mission..... Hawkins..... Hell Roaring.....	8,129.5 911.7 3,127.0 10,499.1	3.910062 2.959872 3.495124 4.021151
Border.....	49 00 05.29 116 12 46.93	2 36 40 79 30 56 112 41 52	182 36 23 259 27 40 292 38 42	Hell Roaring..... Harvey..... Hawkins.....	10,317.0 5,379.6 5,555.6	4.013555 3.730748 3.744729
Mon. 214.....	49 00 02.60 116 12 44.62	80 28 19 150 31 43	260 25 00 330 31 41	Harvey..... Border.....	5,411.4 95.46	3.733307 1.979840
Mon. 212.....	49 00 02.81 116 16 35.22	35 39 09 89 45 02 270 03 09 337 46 39	215 38 45 269 39 38 90 06 03 157 49 13	Harvey..... Mon. 209..... Mon. 214..... Hell Roaring.....	1,113.2 8,732.1 4,687.1 11,048.6	3.046577 3.941118 3.670905 4.043306
Harper.....	49 01 02.18 116 10 10.95	16 49 09 61 00 44 72 06 08 92 41 35	196 46 54 240 58 46 252 00 54 272 36 27	Hell Roaring..... Border..... Harvey..... Hawkins.....	12,601.6 3,624.5 8,891.0 8,303.6	4.100426 3.559243 3.948949 3.919268
Mon. 219.....	49 00 02.56 116 08 15.19	30 26 04 85 18 51 90 54 18 101 51 42	210 22 21 265 12 09 270 50 53 281 45 06	Hell Roaring..... Harvey..... Border..... Hawkins.....	11,851.6 10,850.2 5,523.9 10,878.6	4.073778 4.035437 3.742244 4.036575
Perry.....	49 01 03.07 116 14 45.17	270 15 16 283 13 54 306 35 32 350 53 41	90 18 43 103 18 48 126 37 02 170 54 52	Harper..... Mon. 219..... Border..... Hell Roaring.....	5,572.1 8,142.9 2,993.4 12,245.2	3.746016 3.910777 3.476163 4.087967
Mon. 213.....	49 00 03.20 116 14 10.30	159 02 13 267 48 18 270 35 50	339 01 47 87 49 21 90 36 54	Perry..... Border..... Mon. 214.....	1,960.8 1,695.7 1,741.6	3.296834 3.229361 3.240946
Mon. 218.....	49 00 02.21 116 10 37.50	90 16 50 196 14 25	270 15 14 16 14 45	Mon. 214..... Harper.....	2,583.7 1,929.6	3.412241 3.285466
Mon. 215.....	49 00 02.18 116 11 35.21	222 43 21 269 56 27	42 44 24 89 57 11	Harper..... Mon. 218.....	2,523.6 1,172.9	3.402012 3.069243
Mon. 216.....	49 00 02.20 116 10 53.82	89 57 33 205 10 46 269 55 35	269 57 02 25 11 18 89 55 48	Mon. 215..... Harper..... Mon. 218.....	841.2 2,047.6 331.6	2.924900 3.311251 2.520672
Mon. 217.....	49 00 02.20 116 10 38.82	89 58 00 269 30 33	269 57 49 89 30 34	Mon. 216..... Mon. 218.....	304.8 26.84	2.484015 1.428782
Mon. 220.....	49 00 02.80 116 06 28.15	89 49 00 99 52 52 112 04 45 218 18 40 278 21 24	269 47 40 279 44 55 292 01 57 38 24 14 98 27 36	Mon. 219..... Hawkins..... Harper..... Mahon..... Burke.....	2,175.8 13,014.3 4,885.4 14,441.2 10,129.1	3.337627 4.114422 3.688903 4.159603 4.006573
Mon. 222.....	49 00 03.29 116 01 53.03	89 52 26 115 35 34 196 36 07 288 38 58	269 48 58 295 32 12 16 38 13 108 41 42	Mon. 220..... Hunter..... Mahon..... Burke.....	5,591.9 6,030.8 11,802.0 4,673.6	3.747558 3.780374 4.071956 3.669666
Mon. 221.....	49 00 03.15 116 03 40.58	128 42 22 206 08 28 269 52 47	308 40 21 26 11 55 89 54 08	Hunter..... Mahon..... Mon. 222.....	4,170.0 12,605.3 2,186.0	3.620131 4.100553 3.339658
Mon. 223.....	49 00 03.54 115 58 16.06	89 55 22 104 48 37 174 47 58	269 52 38 284 42 31 354 47 20	Mon. 222..... Hunter..... Mahon.....	4,409.7 10,185.1 11,348.1	3.644408 4.007965 4.054923
Mon. 224.....	49 00 03.66 115 55 08.89	68 18 59 89 57 50 156 52 26 235 18 00	248 16 38 269 55 28 336 49 27 55 24 07	Burke..... Mon. 223..... Mahon..... Lodge.....	4,077.1 3,804.9 12,287.0 12,019.7	3.610349 3.580347 4.089447 4.079893
Mon. 229.....	49 00 03.36 115 43 39.02	32 42 41 90 06 36 148 56 15 234 24 38 278 30 54	212 40 50 269 57 55 328 53 41 54 30 54 98 38 12	Roswell..... Mon. 224..... Lodge..... Bevis..... Wood.....	5,534.8 14,022.0 7,990.3 12,432.8 11,929.6	3.743105 4.146809 3.902563 4.094570 4.076626



## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Speer.....	49 01 29.63 115 47 33.61	74 01 50 188 42 05 209 11 03 346 19 48	253 56 06 8 42 29 119 14 01 166 20 54	Mon. 224..... Lodge..... Mon. 229..... Roswell.....	9,625.3 4,226.6 5,461.4 7,536.2	3.983416 3.625086 3.737302 3.877150
Mon. 227.....	49 00 03.60 115 47 53.09	90 03 26 188 28 17 188 36 34 270 03 21	269 57 57 8 28 32 8 37 13 90 06 33	Mon. 224..... Speer..... Lodge..... Mon. 229.....	8,857.9 2,687.0 6,913.6 5,164.1	3.947329 3.429272 3.839702 3.712996
Mon. 225.....	49 00 03.71 115 53 31.14	89 57 41 148 55 49 229 06 51 249 53 39 269 59 38	269 56 27 328 51 35 49 11 45 69 58 09 90 03 53	Mon. 224..... Mahon..... Lodge..... Speer..... Mon. 227.....	1,966.8 13,192.7 10,446.3 7,735.0 6,871.1	3.298146 4.120333 4.018963 3.888460 3.837025
Mon. 226.....	49 00 03.71 115 51 37.56	90 01 02 219 17 13 241 48 28 270 01 05	269 59 36 39 20 41 61 51 32 90 03 54	Mon. 225..... Lodge..... Speer..... Mon. 227.....	2,308.5 8,831.0 5,623.3 4,562.5	3.363337 3.946012 3.749990 3.659206
Mon. 228.....	49 00 03.51 115 45 56.42	90 04 38 143 25 21 168 57 56 270 04 58	270 03 10 323 24 08 348 57 07 90 06 42	Mon. 227..... Speer..... Lodge..... Mon. 229.....	2,371.4 3,313.3 6,967.2 2,792.7	3.375002 3.520257 3.843059 3.446030
Fork.....	49 01 50.86 115 39 06.46	59 04 50 229 31 02 292 19 41 309 09 56	239 01 25 49 33 52 112 26 00 129 13 48	Mon. 229..... Bevis..... Caribou..... Wood.....	6,457.7 6,018.5 11,037.7 8,069.4	3.810076 3.779490 4.042880 3.906839
Lick.....	48 59 01.20 115 38 38.43	107 28 32 173 47 55 203 39 46 268 32 50	287 24 46 353 47 34 23 42 16 88 36 21	Mon. 229..... Fork..... Bevis..... Wood.....	6,405.5 5,272.0 9,987.8 5,688.2	3.806551 3.721977 3.999468 3.754973
Gold.....	49 01 04.43 115 31 24.93	40 28 48 98 44 45 269 39 06 304 25 12 343 21 12	220 26 51 278 38 57 89 44 23 124 30 18 163 21 43	Wood..... Fork..... Purcell..... Yaak..... Caribou.....	4,817.8 9,485.6 8,514.9 9,989.4 2,889.4	3.682845 3.977067 3.930179 3.999539 3.460802
Wood Lookout.....	48 58 23.09 115 33 38.07	160 56 24 133 54 43 162 18 15 208 29 21 237 54 14 273 26 22	280 52 37 315 50 36 342 17 59 28 31 01 57 56 26 93 33 08	Lick..... Fork..... Wood..... Gold..... Caribou..... Yaak.....	6,220.2 9,259.9 1,383.9 5,671.3 4,171.8 10,968.1	3.793805 3.966608 3.141113 3.753680 3.620327 4.040130
Mon. 236.....	49 00 02.05 115 31 03.73	63 58 37 167 23 51 256 15 04 295 28 24	243 56 25 347 23 35 76 20 05 115 33 14	Wood..... Gold..... Purcell..... Yaak.....	3,960.2 1,974.4 8,322.4 8,650.1	3.597713 3.295442 3.920248 3.937021
Mon. 235.....	49 00 02.52 115 34 35.88	90 11 27 121 21 25 172 48 34 270 10 15	270 04 37 301 18 01 352 48 00 90 12 55	Mon. 229..... Fork..... Bevis..... Mon. 236.....	11,039.8 6,436.7 7,309.7 4,312.2	4.042963 3.808660 3.863902 3.634694
Mon. 231.....	49 00 02.94 115 39 15.41	90 09 56 183 07 11 213 18 52 270 06 03 294 10 44	270 06 37 3 07 18 33 21 49 90 09 34 114 14 58	Mon. 229..... Fork..... Bevis..... Mon. 235..... Wood Lookout.....	5,358.2 3,338.8 8,665.3 5,681.7 7,520.3	3.729018 3.523585 3.937783 3.754476 3.876233
Mon. 230.....	49 00 03.18 115 41 30.04	90 08 10 225 59 31 270 05 38 287 48 33	270 06 33 46 04 10 90 10 51 107 54 29	Mon. 229..... Bevis..... Mon. 235..... Wood Lookout.....	2,621.8 10,416.6 8,418.1 10,081.5	3.418599 4.017728 3.925212 4.003527
Mon. 233.....	49 00 02.94 115 38 38.91	170 28 14 270 07 22 296 43 41 359 42 16	350 27 53 90 10 26 116 47 28 179 42 17	Fork..... Mon. 235..... Wood Lookout..... Lick.....	3,380.6 4,939.8 6,850.2 1,907.2	3.528904 3.693713 3.835705 3.280406
Mon. 232.....	49 00 02.94 115 38 53.32	90 00 05 175 25 17 270 01 24 286 24 03 295 39 54	269 59 48 355 25 07 90 01 34 106 27 46 115 43 52	Mon. 231..... Fork..... Mon. 233..... Wood..... Wood Lookout.....	448.9 3,344.5 292.9 6,243.2 7,113.1	2.652197 3.524328 2.466678 3.795406 3.852058
Mon. 234.....	49 00 02.94 115 37 57.78	23 26 00 90 00 22 300 15 46	203 25 29 269 59 51 120 19 02	Lick..... Mon. 233..... Wood Lookout.....	2,078.6 836.2 6,115.0	3.317764 2.922287 3.786398
Mon. 237.....	49 00 01.54 115 27 50.42	76 51 52 90 15 06 114 02 30	256 49 41 270 12 40 293 59 48	Caribou..... Mon. 236..... Gold.....	3,628.1 3,929.3 4,772.7	3.559676 3.594314 3.678766
Mon. 238.....	49 00 00.95 115 24 38.41	0 26 10 90 17 26	180 26 09 270 12 35	Yaak..... Mon. 236.....	3,691.7 7,832.1	3.567231 3.893880
Mon. 239.....	49 00 00.28 115 21 30.96	46 18 14 90 19 37 119 42 26	226 15 51 270 17 15 299 40 14	Yaak..... Mon. 238..... Purcell.....	5,312.2 3,810.2 4,091.9	3.725277 3.580951 3.611926

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance (meters)	Logarithm
	°	'	"	°	'	"	°	'	"			
Mon. 240.....	48	59	59.38	16	31	42	246	26	32	Yaak.....	9,131.1	3.960524
	115	17	48.00	90	22	33	270	17	23	Mon. 238.....	8,342.1	3.921277
				104	17	58	284	12	58	Purell.....	8,342.7	3.921308
Sam.....	48	59	58.91	269	59	17	90	03	57	Mon. 245.....	7,537.6	3.877233
	115	16	07.81	274	54	03	94	59	13	Bowdich.....	8,369.3	3.922690
				296	45	44	116	50	59	Campbell.....	9,513.9	3.978357
Mon. 241.....	48	59	58.81	90	19	38	270	19	18	Sam.....	533.44	2.727086
	115	15	41.56									
Mon. 242.....	48	59	58.83	90	03	32	270	01	39	Sam.....	3,058.95	3.485572
	115	13	37.31	266	11	16	88	13	53	Gateway.....	4,230.6	3.626406
				269	59	34	90	02	21	Mon. 245.....	4,478.6	3.651147
Mon. 243.....	48	59	58.79	253	34	05	73	34	40	Gateway.....	993.1	2.996991
	115	10	56.49	289	38	34	109	39	49	Bowdich.....	2,134.2	3.329245
Mon. 244.....	48	59	58.79	90	00	20	269	59	56	Mon. 243.....	808.4	2.907622
	115	10	16.72	207	10	19	27	10	24	Gateway.....	315.7	2.499320
				358	47	47	178	47	47	Gateway north base.....	769.0	2.885923
Gateway azimuth station.....	48	59	58.79	90	00	20	269	59	42	Mon. 243.....	1,029.2	3.012483
	115	10	05.86	164	44	55	344	44	52	Gateway.....	291.1	2.464040
				306	11	48	126	12	24	Bowdich.....	1,215.3	3.084689
Mon. 245.....	48	59	58.79	90	01	38	270	01	31	Gateway azimuth station.....	180.6	2.256688
	115	09	56.98	137	31	50	317	31	40	Gateway.....	380.9	2.580762
				311	53	22	131	53	52	Bowdich.....	1,074.8	3.031341
Scott.....	49	00	33.98	51	07	06	231	02	59	Campbell.....	8,554.9	3.932216
	115	03	42.83	127	39	37	307	34	02	Frost.....	11,391.0	4.056562
Flatiron.....	48	58	39.63	74	17	55	254	13	52	Campbell.....	6,790.3	3.831890
	115	03	48.86	139	42	30	319	36	59	Frost.....	13,755.4	4.138472
				181	59	08	1	59	13	Scott.....	3,534.7	3.548353
Mon. 246.....	48	59	58.83	37	32	06	217	30	04	Campbell.....	5,406.6	3.732920
	115	06	28.28	252	05	16	72	07	21	Scott.....	3,533.6	3.548220
				307	01	57	127	03	57	Flatiron.....	4,061.1	3.606641
Kiln.....	48	59	48.19	26	52	21	206	51	41	Flatiron.....	2,374.2	3.375516
	115	02	56.08	62	34	41	242	27	59	Campbell.....	8,576.4	3.933304
				94	22	57	274	20	17	Mon. 246.....	4,325.8	3.636069
				130	02	39	309	56	28	Frost.....	13,018.7	4.114568
				146	07	08	326	06	32	Scott.....	1,704.1	3.231497
Mon. 247 ecc.....	48	59	58.77	13	53	58	193	53	35	Flatiron.....	2,518.6	3.401152
	115	03	19.10	156	05	41	336	05	23	Scott.....	1,189.8	3.075481
				304	56	13	124	56	30	Kiln.....	570.8	2.756517
Mon. 247.....	48	59	58.77	90	02	09	270	02	06	Mon. 247 ecc.....	71.84	1.85634
	115	03	15.57									
Mon. 248.....	48	59	59.53	69	24	34	249	17	30	Campbell.....	12,221.0	4.087108
	114	59	47.81	89	53	27	269	48	24	Mon. 246.....	8,140.1	3.910632
				120	13	41	300	05	08	Frost.....	15,957.6	4.202969
				195	58	46	15	59	37	Baldy.....	4,998.5	3.698838
Mon. 249.....	48	59	59.83	89	43	17	269	42	08	Mon. 248.....	1,835.7	3.263794
	114	58	17.50	174	32	41	354	32	21	Baldy.....	4,817.8	3.682847
Mon. 250.....	49	00	00.36	89	45	28	269	42	06	Mon. 248.....	5,448.9	3.736305
	114	55	19.74	139	36	22	319	33	51	Baldy.....	6,277.5	3.797785
				234	40	25	74	47	53	Wig.....	12,510.8	4.097286
				278	11	00	98	22	15	Tuchuck.....	18,363.4	4.263951
Mon. 251.....	49	00	00.77	89	47	27	269	45	28	Mon. 250.....	3,191.8	3.504040
	114	52	42.71	123	19	32	303	15	02	Baldy.....	8,685.3	3.938785
				249	40	19	69	45	49	Wig.....	9,465.5	3.976144
Mon. 252.....	49	00	01.00	89	48	44	269	45	28	Mon. 250.....	5,275.6	3.722230
	114	51	00.19	117	02	39	296	56	52	Baldy.....	10,485.6	4.020592
				244	14	28	64	18	40	Wig.....	7,543.0	3.877546
				281	36	12	101	44	11	Tuchuck.....	13,167.6	4.119805
Mon. 253.....	49	00	01.37	89	51	30	269	49	02	Mon. 252.....	4,004.2	3.602519
	114	47	43.19	220	32	45	40	34	28	Wig.....	4,294.4	3.632907
Mon. 254.....	49	00	01.54	193	20	40	13	21	08	Wig.....	3,347.7	3.524752
	114	46	03.81	291	16	38	111	20	53	Tuchuck.....	7,373.8	3.867693
Mon. 255.....	49	00	01.54	90	00	20	269	59	55	Mon. 254.....	672.59	2.827748
	114	45	30.71									
Muchuck.....	49	00	29.01	277	43	07	97	48	02	Hefty.....	8,025.2	3.904454
	114	40	49.17	352	22	05	172	22	23	Tuchuck.....	3,560.1	3.551460
Bud.....	49	00	00.72	255	11	56	75	13	59	Muchuck.....	3,424.7	3.534617
	114	43	32.09	271	00	30	91	07	28	Hefty.....	11,265.9	4.051764
				305	01	30	125	03	50	Tuchuck.....	4,623.2	3.664940
Mon. 256.....	49	00	01.95	271	11	50	91	18	49	Hefty.....	11,301.3	4.053127
	114	43	33.80	305	09	41	125	12	02	Tuchuck.....	4,673.3	3.669628
				317	33	16	137	33	17	Bud.....	51.38	1.710820

## GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 257.....	49 00 02.57 114 40 13.44	89 12 35 89 45 01 138 21 38	269 10 05 269 42 30 318 21 11	Bud..... Mon. 256..... Muchuck.....	4,038.2 4,072.5 1,092.9	3.606189 3.609863 3.038582
Mon. 258.....	49 00 03.09 114 37 12.76	55 14 06 89 46 43 274 32 00	235 11 40 269 41 56 94 34 12	Tuchuck..... Mon. 256..... Hefty.....	4,781.6 7,745.0 3,564.7	3.679572 3.889020 3.552020
Mon. 259.....	49 00 03.46 114 34 23.87	89 49 43 337 43 25	269 47 36 157 43 30	Mon. 258..... Hefty.....	3,432.8 317.9	3.535654 2.502345
Mon. 260.....	49 00 03.74 114 31 57.08	83 58 26 244 54 32 285 55 47	263 56 40 65 03 27 106 09 05	Hefty..... Kishenehn..... Kintla.....	2,879.2 15,864.1 22,389.0	3.459276 4.200418 4.350035
Mon. 261.....	49 00 04.04 114 28 40.44	87 25 46 89 53 17 89 53 17 289 23 13	267 21 31 269 50 49 269 48 58 109 34 02	Hefty..... Mon. 260..... Mon. 259..... Kintla.....	6,867.2 3,996.8 6,980.5 18,581.7	3.836781 3.601707 3.843885 4.269096
Mon. 262.....	49 00 04.03 114 27 47.18	87 47 30 90 01 08 234 10 53 290 34 12	267 42 35 270 00 28 54 16 39 110 44 21	Hefty..... Mon. 261..... Kishenehn..... Kintla.....	7,948.9 1,082.6 11,461.5 17,564.1	3.900307 3.034477 4.059242 4.24626
Mon. 263.....	49 00 04.08 114 24 50.64	88 30 07 89 59 37 220 26 04 295 41 19	268 22 59 269 57 23 40 29 36 115 49 16	Hefty..... Mon. 262..... Kishenehn..... Kintla.....	11,535.3 3,588.2 8,803.9 14,261.7	4.062029 3.554875 3.944676 4.154172
Mon. 264.....	49 00 04.08 114 23 21.30	88 43 23 90 00 28 210 10 52 299 16 36	268 35 07 269 59 21 30 13 17 119 23 25	Hefty..... Mon. 263..... Kishenehn..... Kintla.....	13,350.8 1,816.0 7,750.1 12,649.9	4.125506 3.259114 3.893035 4.102087
Sub-265.....	49 00 04.15 114 22 13.85	89 55 06 200 40 25 302 39 01	269 54 15 20 41 59 122 44 59	Mon. 264..... Kishenehn..... Kintla.....	1,371.0 7,157.4 11,474.9	3.137025 3.854758 4.059748
Mon. 266.....	49 00 04.09 114 21 39.41	90 00 25 90 10 00 195 15 46	269 59 08 270 09 34 15 16 54	Mon. 264..... Sub-265..... Kishenehn.....	2,071.0 700.0 6,943.2	3.316170 2.845092 3.841557
Mon. 265.....	49 00 04.08 114 22 03.78	90 00 35 90 36 26 269 58 38	269 59 36 270 36 19 89 58 57	Mon. 264..... Sub-265..... Mon. 266.....	1,575.5 204.55 495.45	3.197418 2.310791 2.694995
Mon. 267.....	49 00 03.14 114 19 13.24	90 21 30 170 23 08 315 50 22	270 18 22 350 22 25 135 54 04	Mon. 264..... Kishenehn..... Kintla.....	5,042.0 6,823.3 8,593.1	3.702804 3.833994 3.934150
Point Edward.....	49 01 21.49 114 16 24.98	54 43 28 74 15 41 133 24 20 343 23 02	234 41 21 254 10 26 313 21 31 163 24 37	Mon. 267..... Mon. 264..... Kishenehn..... Kintla.....	4,189.3 8,791.6 6,270.5 8,961.9	3.622139 3.944066 3.797300 3.952399
Mon. 268.....	49 00 01.60 114 15 33.90	90 30 45 90 38 06 157 11 38	270 24 52 270 35 20 337 11 00	Mon. 264..... Mon. 267..... Point Edward.....	9,500.6 4,458.6 2,677.4	3.977751 3.649198 3.427718
Sub-269.....	49 59 57.19 114 12 00.43	25 14 14 124 52 54 208 28 46 274 30 17	205 12 29 304 46 45 28 31 54 94 36 27	Kintla..... Kishenehn..... North Divide..... South Divide.....	6,614.9 12,100.1 10,574.1 9,991.7	3.820521 4.082789 4.024245 3.999640
Mon. 269.....	48 59 59.98 114 11 59.37	14 03 24 115 02 07 124 29 15 208 36 02	194 03 23 294 58 46 304 23 05 28 39 09	Sub-269..... Point Edward..... Kishenehn..... North Divide.....	88.9 5,955.9 12,088.8 10,488.0	1.949100 3.774949 4.081663 4.020694
Akamina.....	49 01 20.08 114 08 13.18	41 04 52 61 01 08 183 39 37	221 00 15 240 58 16 3 39 53	Kintla..... Sub-269..... North Divide.....	11,329.1 5,280.5 6,745.6	4.054196 3.722679 3.829018
Mon. 270.....	48 59 59.38 114 10 45.45	87 28 19 200 53 15 231 07 44 275 47 08	267 27 22 20 55 26 51 09 39 95 52 21	Sub-269..... North Divide..... Akamina..... South Divide.....	1,525.5 9,874.8 3,973.8 8,479.8	3.183425 3.994529 3.596204 3.928384
Goat.....	48 59 57.68 114 07 21.77	90 44 50 157 41 27	270 42 16 337 40 48	Mon. 270..... Akamina.....	4,140.5 2,751.5	3.617054 3.439566
Mon. 271.....	48 59 57.89 114 07 42.74	166 18 39 270 52 45	346 18 16 90 53 01	Akamina..... Goat.....	2,613.1 426.3	3.417162 2.629730
Mon. 272.....	48 59 56.00 114 04 01.96	64 42 27 90 15 58 90 46 12 342 49 45	244 34 42 270 09 57 270 41 08 162 49 54	Kintla..... Sub-269..... Mon. 270..... South Divide.....	13,887.7 9,725.6 8,202.1 792.3	4.142629 3.987918 3.913926 2.898916
Red Mountain.....	49 00 19.00 114 05 40.51	57 47 13 85 03 16 162 48 15 303 15 07	237 40 42 264 58 29 342 46 36 123 16 30	Kintla..... Sub-269..... North Divide..... South Divide.....	12,470.8 7,751.4 9,022.6 2,675.2	4.095896 3.889381 3.955331 3.427357

GEOGRAPHIC POSITIONS OF TRIANGULATION STATIONS AND MONUMENTS, SUMMIT OF  
ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 273.....	48 59 55.89 114 02 30.18	65 13 04 90 06 45 145 01 54 286 50 06	245 12 04 270 05 36 324 57 51 106 54 49	South Divide..... Mon. 272..... North Divide..... Campbell S. W.....	1,797.5 1,865.6 11,392.9 7,976.0	3.254664 3.270822 4.056634 3.901784
Mon. 274.....	48 59 55.60 113 58 26.40	83 35 09 90 07 54 310 44 14	263 31 05 270 04 50 130 45 54	South Divide..... Mon. 273..... Campbell S. W.....	6,629.5 4,955.4 3,532.7	3.821478 3.695075 3.548105
Mon. 275.....	48 59 55.45 113 56 16.07	85 28 02 90 08 41 90 08 33 359 20 12	265 22 19 270 05 03 270 03 50 179 20 13	South Divide..... Mon. 274..... Mon. 273..... Campbell S. W.....	9,266.3 2,049.0 7,004.4 2,301.7	3.966906 3.423083 3.881063 3.362045
Campbell No. 1.....	48 58 54.22 113 55 48.04	65 58 12 96 44 49 148 56 37	232 57 52 276 38 45 328 54 53	Campbell S. W..... South Divide..... Waterton.....	680.7 9,875.6 5,437.0	2.832958 3.994563 3.735357
Cleveland.....	48 55 29.66 113 50 50.07	115 16 55 130 18 54 131 50 43 141 06 40 201 18 01 243 01 59 267 03 40	295 07 07 310 06 03 311 46 38 321 01 11 21 20 51 63 06 04 87 14 27	South Divide..... North Divide..... Campbell S. W..... Waterton..... Sofa..... Belly..... Chief Mountain.....	17,545.3 27,195.6 8,863.3 14,110.3 12,006.1 7,433.1 17,497.2	4.244162 4.434498 3.947596 4.149535 4.100648 3.871169 4.242969
Mon. 277.....	48 59 54.61 113 52 12.64	65 12 55 90 19 32 348 23 38	245 09 52 270 16 28 168 24 40	Campbell S. W..... Mon. 275..... Cleveland.....	5,423.1 4,948.3 8,355.2	3.734249 3.694452 3.921956
Mon. 276.....	48 59 55.32 113 54 18.27	44 02 51 90 06 37 270 28 36 332 40 52	224 01 44 270 05 06 90 30 10 152 43 30	Campbell No. 1..... Mon. 275..... Mon. 277..... Cleveland.....	2,625.6 2,394.7 2,553.6 9,234.8	3.419225 3.379243 3.407159 3.965427
Belly East.....	48 57 15.73 113 44 56.90	162 58 09 231 25 00	342 56 33 51 30 46	Sofa..... Rim.....	8,857.2 11,926.9	3.947297 4.076529
Chief North.....	48 56 43.86 113 35 31.53	94 57 05 123 55 40 165 34 51 229 10 27 255 19 20	274 49 59 303 46 57 345 33 30 49 16 44 75 25 02	Belly East..... Sofa..... Rim..... Police..... Pike.....	11,545.5 16,968.0 8,689.2 13,396.6 9,535.6	4.062413 4.226631 3.938979 4.127058 3.979350
Gus.....	48 58 44.52 113 44 16.15	27 38 37 149 08 19 298 31 59	207 37 46 329 06 12 118 37 49	Belly..... Sofa..... Chief Mountain.....	2,994.1 6,671.2 10,764.0	3.476272 3.824201 4.031972
West.....	48 59 56.77 113 42 35.44	42 32 28 122 35 49	222 31 12 302 32 26	Gus..... Sofa.....	3,028.7 6,490.0	3.481255 3.812245
Jack.....	49 00 45.41 113 38 07.24	54 20 53 63 33 55 74 36 57 100 23 28 347 37 55	234 15 21 243 29 16 254 33 35 280 16 42 167 39 07	Belly..... Gus..... West..... Sofa..... Chief Mountain.....	10,946.0 8,377.6 5,654.2 11,097.9 9,094.9	4.039254 3.923117 3.752375 4.045242 3.958799
Mon. 278.....	48 59 53.70 113 49 26.28	90 29 44 218 43 22 263 19 33 269 18 23 298 41 28 314 12 59	270 27 39 38 45 09 83 28 06 90 23 33 108 45 22 134 16 01	Mon. 277..... Sofa..... Jack..... West..... Gus..... Belly.....	3,381.7 4,600.5 13,892.9 8,351.4 6,657.5 6,865.0	3.529141 3.662805 4.142792 3.921760 3.823312 3.836639
Mon. 280.....	48 59 51.41 113 42 36.55	90 31 46 187 44 18 253 01 18	270 26 36 7 44 19 73 04 41	Mon. 278..... West..... Jack.....	8,328.8 167.05 5,722.1	3.920583 2.222837 3.757553
Mon. 279.....	48 59 52.64 113 46 08.45	90 29 16 268 17 22 270 28 56 312 39 10	270 26 47 88 20 03 90 31 36 132 40 35	Mon. 278..... West..... Mon. 280..... Gus.....	4,021.4 4,331.6 4,307.5 3,105.0	3.604372 3.636648 3.634221 3.492063
Mon. 281.....	48 59 51.08 113 41 37.75	57 27 21 90 29 09 248 33 38	237 25 22 270 28 24 68 36 17	Gus..... Mon. 280..... Jack.....	3,820.8 1,195.2 4,595.9	3.582160 3.077453 3.662366
Mon. 282.....	48 59 51.96 113 38 59.94	72 04 39 89 32 03 91 57 52 110 20 45 212 57 46	252 00 40 269 30 04 271 55 09 290 14 39 32 58 26	Gus..... Mon. 281..... West..... Sofa..... Jack.....	6,758.0 3,208.1 4,383.1 10,500.6 1,968.1	3.829817 3.506243 3.641780 4.021213 3.294054
Mon. 283.....	48 59 52.77 113 36 31.52	0 00 06 159 52 58	180 00 06 339 52 23	Chief Mountain..... Rim.....	7,258.1 2,747.0	3.860820 3.438861
Mon. 284.....	48 59 53.30 113 34 53.47	15 20 35 89 32 27 89 33 09 112 15 14 131 07 11 292 08 00	195 19 21 269 31 13 269 30 03 292 12 48 311 05 22 112 13 13	Chief Mountain..... Mon. 283..... Mon. 282..... Jack..... Rim..... Pike.....	7,542.9 1,993.1 5,010.1 4,254.5 3,898.5 9,122.7	3.877536 3.299522 3.699843 3.628844 3.590898 3.960124

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 285.....	48 59 53.04 113 34 00.82	22 53 20 90 25 38 122 42 04 294 56 01	202 51 26 270 24 59 302 39 35 115 00 35	Chief Mountain..... Mon. 284..... Rim..... Pike.....	7,886.6 1,070.3 4,761.3 8,138.0	3.896892 3.029495 3.677727 3.910520
Mon. 286.....	48 59 52.33 113 31 33.55	39 56 51 90 26 03 110 21 34 241 04 45 307 53 31	219 53 06 270 24 12 290 17 14 61 08 02 127 56 14	Chief Mountain..... Mon. 285..... Rim..... Police..... Pike.....	9,445.6 2,993.6 7,465.1 6,059.7 5,555.5	3.975220 3.476192 3.873037 3.782449 3.744720
Mon. 287.....	48 59 52.58 113 29 35.26	49 27 43 89 49 37 105 25 05 224 48 06 329 57 43	229 22 29 269 48 08 285 19 15 44 49 54 149 58 56	Chief Mountain..... Mon. 286..... Rim..... Police..... Pike.....	11,148.4 2,404.5 9,753.1 4,116.6 3,352.0	4.047213 3.381023 3.989143 3.614534 3.506812
Mon. 288.....	48 59 52.84 113 27 35.37	7 38 45 56 24 12 89 49 41 189 04 13	187 38 28 236 17 27 269 48 10 9 04 30	Pike..... Chief Mountain..... Mon. 287..... Police.....	3,460.1 13,101.3 2,437.1 2,949.2	3.539092 4.117315 3.386877 3.469703
Mon. 289.....	48 59 52.95 113 25 54.05	36 17 58 60 48 35 89 54 49 300 18 39 319 12 30	216 16 24 240 40 34 269 53 33 120 23 18 139 14 17	Pike..... Chief Mountain..... Mon. 288..... Spider..... St. Mary south base.....	4,258.8 14,862.5 2,059.6 8,733.5 4,428.9	3.629285 4.172063 3.313780 3.941187 3.646296
Mon. 290.....	48 59 53.17 113 23 13.64	6 16 07 59 16 56 89 53 52 315 55 57	186 15 53 239 13 21 269 51 51 135 58 36	St. Mary south base..... Pike..... Mon. 289..... Spider.....	3,380.8 6,727.8 3,260.6 6,148.6	3.529019 3.827874 3.513302 3.786778
Rankin.....	48 59 29.37 113 17 19.52	261 21 00 342 15 44	81 23 57 162 17 06	373-S..... Galbreath.....	4,804.0 7,167.6	3.681602 3.855375
Arnold.....	49 01 12.94 113 16 24.58	19 14 41 304 17 59 353 56 06	199 13 59 124 20 14 173 56 46	Rankin..... 373-S..... Galbreath.....	3,388.8 4,397.2 10,063.2	3.530048 3.643176 4.003599
Mon. 291.....	48 59 53.38 113 20 42.59	45 38 04 68 46 39 89 54 46 280 09 47 344 47 13	225 35 56 248 41 10 269 50 51 100 12 20 164 47 58	St. Mary south base..... Pike..... Mon. 289..... Rankin..... Spider.....	4,813.8 9,500.4 6,331.0 4,194.0 4,586.6	3.682492 3.977743 3.801474 3.622629 3.661495
Lorin.....	48 59 17.90 113 19 28.52	5 12 10 77 16 22 126 03 22	185 11 59 257 09 57 306 02 26	Spider..... Pike..... Mon. 291.....	3,343.9 10,623.7 1,862.4	3.524249 4.026276 3.270065
Lem.....	48 59 17.07 113 17 40.03	142 24 51 257 56 57 338 01 41	322 22 49 78 00 09 158 03 17	St. Mary..... 373-S..... Galbreath.....	5,372.7 5,282.5 6,951.6	3.730195 3.722838 3.842066
Mon. 292.....	48 59 53.53 113 18 53.42	32 57 45 72 44 54 89 53 31 230 56 17 291 20 36	212 57 19 252 38 04 269 52 09 50 58 09 111 21 47	Lorin..... Pike..... Mon. 291..... Arnold..... Rankin.....	1,311.7 11,598.4 2,219.1 3,894.5 2,049.3	3.117822 4.064399 3.346185 3.590457 3.311009
Mon. 293.....	48 59 53.67 113 17 11.04	12 56 06 75 21 04 89 54 07 128 58 18 201 04 47 270 21 12	192 55 59 255 12 56 269 51 28 308 55 55 21 05 23 90 24 02	Rankin..... Pike..... Mon. 291..... St. Mary..... Arnold..... 373-S.....	770.1 13,600.9 4,300.0 4,972.4 2,624.7 4,577.1	2.886556 4.133567 3.633470 3.696568 3.419082 3.660588
Mon. 294.....	48 59 53.79 113 15 33.61	66 11 37 70 41 58 118 07 54 157 02 48 270 44 12	246 10 02 250 40 38 298 04 17 337 02 10 90 45 48	Lem..... Rankin..... St. Mary..... Arnold..... 373-S.....	2,809.1 2,281.3 6,628.2 2,655.5 2,596.7	3.448565 3.358191 3.821397 3.424139 3.414424
Mon. 295.....	48 59 53.95 113 13 24.31	18 56 42 39 13 51 89 54 19 297 54 52	198 55 06 219 13 50 269 52 41 117 58 48	Galbreath..... 373-S..... Mon. 294..... Stack.....	8,020.6 50.3 2,628.3 7,212.5	3.904207 1.701491 3.419674 3.858066
Mon. 296.....	48 59 54.04 113 12 26.72	26 27 28 88 01 41 89 52 47 303 01 02	206 25 08 268 00 57 269 52 04 123 04 15	Galbreath..... 373-S..... Mon. 295..... Stack.....	8,475.8 1,203.3 1,170.7 6,203.7	3.928179 3.080356 3.068455 3.792653
Mon. 297.....	48 59 54.24 113 10 20.39	39 53 58 89 52 37 322 09 17	219 50 03 269 51 02 142 10 55	Galbreath..... Mon. 296..... Stack.....	9,895.8 2,567.8 4,290.7	3.995452 3.409561 3.632533
Mon. 298.....	48 59 54.41 113 08 25.59	48 49 55 89 52 43 263 05 19 354 59 29	228 44 33 269 51 17 83 08 52 174 59 40	Galbreath..... Mon. 297..... Milk..... Stack.....	11,536.4 2,333.6 5,764.5 3,407.3	4.062071 3.368030 3.760759 3.532414
Mon. 299.....	48 59 54.57 113 06 14.50	34 52 30 89 40 02 89 54 39 257 20 38	214 51 02 269 34 37 269 53 00 77 22 31	Stack..... 373-S..... Mon. 298..... Milk.....	4,142.6 8,768.7 2,664.5 3,134.5	3.617274 3.942935 3.425623 3.496173

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 300.....	48 59 54.74 113 03 48.36	57 30 22 89 54 42 187 22 17 264 04 30 347 54 31	237 27 04 269 52 52 7 22 20 84 10 06 167 55 43	Stack..... Mon. 299..... Milk..... Bunch..... Lincoln.....	6,332.6 2,970.7 686.2 9,100.5 9,380.5	3.801580 3.472859 2.836471 3.958063 3.972227
Mon. 301.....	48 59 54.86 113 02 12.29	89 53 52 262 30 55 359 56 35	269 52 40 82 35 19 179 56 35	Mon. 300..... Bunch..... Lincoln.....	1,952.6 7,160.6 9,176.6	3.290619 3.854947 3.962681
Mon. 302.....	48 59 55.08 112 59 21.76	20 39 50 89 54 21 255 45 11	200 37 41 269 52 12 75 47 26	Lincoln..... Mon. 301..... Bunch.....	9,813.6 3,460.5 3,749.0	3.991829 3.539888 3.573912
Mon. 303.....	48 59 54.80 112 57 07.44	34 03 03 90 12 03 94 51 20 224 10 20	213 59 14 270 10 22 274 46 21 44 10 54	Lincoln..... Mon. 302..... Milk..... Bunch.....	11,068.9 2,730.2 8,089.3 1,297.2	4.044103 3.436198 3.907910 3.113008
Mon. 304.....	48 59 54.57 112 55 22.89	0 39 28 89 59 12 127 31 10 240 01 54 301 58 44 302 01 25	180 39 27 269 58 18 307 30 25 60 04 31 122 00 43 122 03 25	Gap..... Boundary west base..... Bunch..... Bluff..... Ridge (U. S. C. & G. S.)..... Ridge.....	1,773.6 1,448.2 1,539.4 4,874.8 3,801.9 3,803.9	3.248848 3.160840 3.187352 3.687959 3.579997 3.580231
Mon. 305.....	48 59 54.64 112 53 18.76	55 05 51 89 57 47 104 02 39 214 58 35	235 04 17 269 56 13 284 00 20 34 59 38	Gap..... Mon. 304..... Bunch..... Bluff.....	3,102.3 2,523.1 3,859.0 2,967.5	3.491084 3.401936 3.586476 3.472387
Mon. 306.....	48 59 54.71 112 51 16.75	41 21 16 89 57 36 162 14 27	221 20 10 269 56 04 342 13 58	Ridge..... Mon. 305..... Bluff.....	2,694.0 2,480.1 2,550.6	3.430401 3.394473 3.406638
Basin.....	48 58 44.73 112 49 37.40	92 07 09 136 57 16 148 39 19 256 20 31	272 04 48 316 56 01 328 37 36 76 23 12	Ridge..... Mon. 306..... Bluff..... Center.....	3,802.8 2,958.6 5,376.1 4,449.6	3.580106 3.471092 3.730471 3.648320
Mon. 307.....	48 59 54.78 112 49 20.18	64 00 44 89 57 38 127 39 15	243 58 10 269 56 10 307 37 18	Ridge..... Mon. 306..... Bluff.....	4,617.1 2,369.4 3,974.1	3.664367 3.374637 3.599235
Mon. 308.....	48 59 54.85 112 47 25.98	50 58 50 72 38 32 89 57 23 259 31 52 304 04 01	230 57 11 252 34 32 269 55 57 79 33 37 124 05 03	Basin..... Ridge..... Mon. 307..... Bench..... Center.....	3,439.7 6,781.4 2,321.5 2,894.9 1,994.1	3.536522 3.831319 3.365768 3.461636 3.299740
Mon. 309.....	48 59 54.93 112 45 33.42	29 37 03 77 00 09 89 57 15 226 54 41	209 36 40 256 54 44 269 55 50 46 55 02	Center..... Ridge..... Mon. 308..... Bench.....	1,287.8 8,991.6 2,287.8 765.6	3.109837 3.953836 3.359421 2.884014
Mon. 310.....	48 59 55.07 112 43 27.76	9 27 28 239 36 41 303 08 05	189 26 55 59 38 44 123 11 19	South..... Table..... Bend.....	5,464.1 3,846.0 6,214.0	3.737516 3.585012 3.795461
Mon. 311.....	48 59 55.20 112 41 36.23	30 25 29 89 54 38 96 54 20 319 06 42	210 23 32 269 53 14 276 51 42 139 08 32	South..... Mon. 310..... Bench..... Bend.....	6,254.2 2,267.1 4,292.9 4,522.1	3.796172 3.355475 3.632755 3.655343
Mon. 312.....	48 59 55.28 112 39 25.03	89 57 38 140 12 15 355 07 50	269 55 59 320 11 15 175 08 01	Mon. 311..... Table..... Bend.....	2,667.0 2,522.8 3,434.3	3.426016 3.401880 3.535842
Mon. 313.....	48 59 55.36 112 37 25.31	32 02 50 89 57 29 115 34 42 287 30 45	212 01 31 269 55 59 295 32 12 107 36 55	Bend..... Mon. 312..... Table..... Antelope.....	4,039.4 2,433.4 4,487.0 10,464.4	3.606318 3.386217 3.651959 4.019716
Mon. 314.....	48 59 55.41 112 35 35.25	51 59 41 89 58 07 107 08 16 292 10 08	231 56 59 269 56 44 287 04 23 112 14 55	Bend..... Mon. 313..... Table..... Antelope.....	5,561.2 2,237.2 6,575.7 8,358.9	3.745168 3.349705 3.817940 3.922149
Mon. 315.....	48 59 55.47 112 33 48.58	62 24 30 89 57 55 299 32 55	242 20 27 269 56 34 119 36 21	Bend..... Mon. 314..... Antelope.....	7,392.2 2,168.2 6,404.5	3.868772 3.336094 3.806488
Mon. 316.....	48 59 55.49 112 31 49.12	69 08 52 89 59 54 274 51 17 315 10 23	249 03 19 269 58 24 94 57 07 135 12 20	Bend..... Mon. 315..... Line..... Antelope.....	9,610.7 2,428.3 9,465.8 4,456.8	3.982755 3.385296 3.976156 3.649026
Mon. 317.....	48 59 55.52 112 29 36.48	89 59 46 276 49 22 352 00 16	269 58 06 96 53 32 172 00 33	Mon. 316..... Line..... Antelope.....	2,696.1 6,783.3 3,193.7	3.430744 3.831442 3.504297
Mon. 318.....	48 59 55.22 112 28 17.50	20 13 49 90 20 11 278 50 48	200 13 06 270 19 11 98 53 58	Antelope..... Mon. 317..... Line.....	3,360.7 1,605.5 5,191.4	3.526430 3.205598 3.715282

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 319.....	48 59 54.78 112 26 18.41	48 47 25 90 20 04 286 11 29	228 45 12 270 18 34 106 13 10	Antelope..... Mon. 318..... Line.....	4,764.2 2,420.7 2,820.5	3.677993 3.383942 3.450322
Mon. 320.....	48 59 55.33 112 23 32.48	89 43 44 89 59 47 176 18 32	269 41 39 266 56 12 356 18 23	Mon. 319..... Mon. 318..... Foot.....	3,372.8 5,793.4 3,949.1	3.527994 3.762937 3.596501
Mon. 321.....	48 59 55.30 112 21 10.49	76 02 01 90 01 45 307 31 58 353 20 02	256 01 02 269 59 58 127 34 42 173 20 13	Track..... Mon. 320..... Corner..... Clear.....	1,618.7 2,886.2 5,578.7 2,610.1	3.209176 3.460329 3.746532 3.416653
Rain.....	48 59 56.25 112 19 47.34	27 04 52 81 04 37 128 22 06 213 38 36	207 04 00 261 02 36 308 19 07 33 40 02	Clear..... Track..... Foot..... Lake.....	3,048.5 3,301.0 6,156.9 4,188.1	3.484093 3.518646 3.789364 3.622015
Mon. 322.....	48 59 55.31 112 20 00.36	23 25 31 82 34 51 90 00 12 245 14 53	203 24 49 262 33 00 269 59 19 65 15 03	Clear..... Track..... Mon. 321..... Rain.....	2,825.3 3,021.8 1,425.5 261.3	3.451062 3.480266 3.153974 2.464322
Quartz.....	49 00 12.31 112 14 39.83	41 54 14 159 16 59 267 42 56 302 27 32	221 52 04 339 16 18 87 48 27 122 31 09	Corner..... Horse..... Red..... Cairn.....	5,273.0 3,090.8 8,917.9 6,926.5	3.722061 3.490067 3.950261 3.840511
Mon. 323.....	48 59 55.31 112 17 51.83	90 00 43 92 59 01 179 35 03 262 18 59 353 34 01	269 59 06 272 57 34 359 35 02 82 21 24 173 34 16	Mon. 322..... Rain..... Lake..... Quartz..... Corner.....	2,612.5 2,351.1 3,608.1 3,937.8 3,422.1	3.417062 3.371277 3.557277 3.595252 3.534268
Mon. 324.....	48 59 55.30 112 16 03.35	90 00 53 90 01 32 91 33 31 148 17 12	269 59 31 269 58 33 271 30 42 328 15 49	Mon. 323..... Mon. 322..... Rain..... Lake.....	2,205.1 4,817.6 4,554.7 4,241.9	3.343428 3.682834 3.658458 3.627564
Mon. 325.....	48 59 55.30 112 14 16.44	90 01 03 137 52 21 264 02 34 300 44 12	269 59 42 317 52 04 84 07 47 120 47 31	Mon. 324..... Quartz..... Red..... Cairn.....	2,173.1 708.6 8,481.3 6,246.2	3.337071 2.850379 3.928463 3.795615
Miller.....	48 59 15.95 112 08 54.55	30 45 42 222 10 44 276 49 25	210 44 58 42 11 54 96 54 00	Cairn..... Red..... Cliff.....	2,303.3 2,820.0 7,470.1	3.362356 3.450244 3.873324
Mon. 326.....	48 59 55.28 112 11 48.32	90 01 31 98 35 55 260 49 03 288 57 46 323 35 01	269 59 39 278 33 46 80 52 24 108 59 57 143 36 28	Mon. 325..... Quartz..... Red..... Miller..... Cairn.....	3,010.8 3,525.5 5,495.6 3,735.8 3,969.0	3.478687 3.547217 3.740013 3.572379 3.598682
Mon. 327.....	48 59 55.27 112 09 31.47	90 01 16 94 49 58 114 56 38 328 16 52	269 59 33 274 46 05 294 52 05 148 17 20	Mon. 326..... Quartz..... Horse..... Miller.....	2,781.6 6,289.6 8,114.2 1,428.0	3.444302 3.798622 3.909246 3.154722
Mon. 328.....	48 59 55.27 112 07 42.73	50 14 46 90 00 39 90 01 45 289 27 15	230 13 52 269 59 17 269 58 40 109 30 56	Miller..... Mon. 327..... Mon. 326..... Cliff.....	1,899.3 2,210.5 4,992.1 6,317.4	3.278590 3.344481 3.698283 3.800540
Mon. 329.....	48 59 55.26 112 06 00.36	55 56 07 71 05 10 90 00 55 117 59 14 298 31 09	235 53 12 251 02 58 269 59 38 297 58 13 118 33 33	Cairn..... Miller..... Mon. 328..... Red..... Cliff.....	5,698.6 3,743.6 2,080.8 1,864.7 4,410.3	3.755770 3.573285 3.318234 3.270612 3.644469
Mon. 330.....	48 59 55.23 112 03 47.60	90 02 18 101 25 14 330 49 29	270 00 38 281 22 33 150 50 12	Mon. 329..... Red..... Cliff.....	2,698.4 4,432.4 2,411.8	3.431110 3.646639 3.382337
Mon. 331.....	48 59 55.19 112 01 21.89	240 14 22 261 44 13 294 47 04	60 16 36 81 45 53 114 49 47	Tennant..... Peg..... Moberly.....	4,149.5 2,718.6 4,853.7	3.617991 3.434350 3.686076
Mon. 332.....	48 59 54.75 111 59 40.11	61 32 54 90 23 16 216 30 46 237 00 17 310 52 12	241 30 31 270 21 59 36 31 43 57 00 40 130 53 39	Cliff..... Mon. 331..... Tennant..... Peg..... Moberly.....	4,386.8 2,068.8 2,578.4 741.3 3,090.6	3.642149 3.315723 3.411354 2.870021 3.490049
Mon. 333.....	48 59 54.36 111 58 06.89	137 09 27 154 05 05 170 12 00	317 08 20 334 04 39 350 11 47	Coutts N. W. base..... Coutts S. E. base..... Tennant.....	2,669.5 1,595.9 2,115.2	3.426424 3.203011 3.325353
Mon. 335.....	48 59 54.01 111 56 38.20	90 21 20 118 34 25 120 04 47 134 07 46	270 20 13 298 32 11 300 03 14 314 06 26	Mon. 333..... Coutts N. W. base..... Coutts S. E. base..... Tennant.....	1,801.0 4,116.9 2,886.7 3,009.8	3.255511 3.614575 3.460406 3.478531

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 351.....	48 59 48.88 111 26 39.42	77 06 39 161 06 34 242 49 19 300 18 30	257 02 04 341 06 26 62 55 18 120 23 56	Mountain..... Center III..... Breed..... Roscoe.....	7,601.4 633.1 10,868.9 10,177.1	3.880896 2.801496 4.036184 4.007625
Mon. 354.....	48 59 49.49 111 21 21.60	89 51 59 95 00 34 335 47 55	269 47 59 274 56 27 155 49 21	Mon. 351..... Center III..... Roscoe.....	6,460.5 6,690.3 5,658.5	3.810264 3.825446 3.752705
Mon. 356.....	48 59 50.01 111 16 39.42	33 27 42 152 55 07 275 43 13 314 51 36	213 25 35 332 53 33 95 47 30 134 58 08	Roscoe..... Breed..... Center IV..... East Butte.....	6,205.2 5,527.7 6,967.3 14,959.0	3.792758 3.742546 3.843066 4.174902
Mon. 362.....	48 59 51.52 111 05 19.56	16 59 52 241 21 17 276 52 26	196 57 52 61 25 02 96 54 58	East Butte..... Kop..... Center V.....	11,092.1 6,911.8 4,125.0	4.045014 3.839591 3.615422
Mon. 366.....	48 59 52.93 110 56 44.81	29 45 09 52 13 51 265 17 51	209 42 11 232 05 23 85 18 23	Laird..... East Butte..... Center VI.....	9,687.5 17,363.9 846.5	3.986213 4.239648 2.927608
Mon. 370.....	48 59 54.15 110 49 31.38	90 16 06 239 35 25 331 03 52	270 11 10 59 40 13 151 04 20	Center VI..... Spencer..... Center VII.....	7,966.7 8,999.1 1,561.6	3.901279 3.954200 3.193583
Mon. 374.....	48 59 55.28 110 40 59.21	40 04 27 149 40 37 244 40 33 296 35 49 301 04 40	220 01 37 329 38 59 64 48 58 116 40 01 121 12 04	Strode..... Spencer..... Bar 5..... Center VIII..... Christianson.....	7,121.4 5,231.2 15,020.2 7,600.5 13,962.4	3.852568 3.718602 4.176676 3.880843 4.144963
Mon. 383.....	48 59 56.76 110 22 52.90	79 21 55 240 41 41 310 29 27	259 21 03 60 45 11 130 31 41	Center IX..... Center X..... Pugsley & Simpson.....	1,432.0 6,496.5 4,729.8	3.155956 3.812678 3.674813
Mon. 384.....	48 59 56.91 110 21 09.16	89 52 55 334 12 09	269 51 37 154 13 04	Mon. 383..... Pugsley & Simpson.....	2,157.8 3,417.5	3.324003 3.533707
Mon. 385.....	48 59 57.06 110 19 31.08	9 21 02 89 52 55 89 53 33 149 04 28	189 20 43 269 51 41 269 51 01 329 01 58	Pugsley & Simpson..... Mon. 384..... Mon. 383..... Blacktail.....	3,123.0 1,993.6 4,102.2 7,850.2	3.494576 3.299631 3.613018 3.894879
Mon. 386.....	48 59 57.28 110 17 08.59	47 48 16 89 52 49	227 46 10 269 51 01	Pugsley & Simpson..... Mon. 385.....	4,596.5 2,896.4	3.662432 3.461855
Mon. 387.....	48 59 57.44 110 15 25.44	60 40 54 89 52 36 89 53 28 132 40 09 237 06 16 297 13 25	240 37 30 269 51 18 269 50 23 312 38 01 57 12 59 117 20 29	Pugsley & Simpson..... Mon. 386..... Mon. 385..... Center X..... Hat..... Havre.....	6,311.6 2,096.7 4,993.0 4,658.0 12,918.2 12,877.3	3.800142 3.321527 3.698365 3.668200 4.111203 4.109826
Mon. 393.....	48 59 58.45 110 02 34.21	35 34 04 212 53 18 335 19 00	215 31 26 32 56 06 155 21 23	Havre..... Day..... Toledo.....	7,293.0 8,329.2 9,218.2	3.862905 3.920602 3.964645
Mon. 399.....	48 59 59.35 109 50 42.36	149 26 18 331 17 51	329 25 25 151 19 55	Center XI..... Chinook.....	2,804.5 6,947.5	3.447854 3.841832
Mon. 401.....	48 59 59.62 109 46 45.44	13 40 15 89 55 30 216 19 00	193 39 20 269 52 31 36 20 47	Chinook..... Mon. 399..... Center XII.....	6,281.0 4,815.8 4,836.2	3.798030 3.682671 3.684508
Mon. 403.....	48 59 59.92 109 42 48.15	45 56 30 89 54 58 153 17 39 336 30 14	225 52 36 269 51 59 333 16 26 156 32 10	Chinook..... Mon. 401..... Center XII..... Police.....	8,784.8 4,823.2 4,351.2 7,840.5	3.943730 3.683338 3.638609 3.894342
Mon. 415.....	49 00 01.29 109 21 52.83	102 07 21 184 29 59 351 51 27	282 01 17 4 30 12 171 51 36	Center XIII..... Ryder..... Shep.....	10,025.6 4,303.8 1,691.0	4.001112 3.633856 3.228133
Mon. 418 ecc.....	49 00 00.46 109 16 39.31	32 36 02 74 59 26 90 15 48	212 36 02 254 55 38 270 11 51	318..... Shep..... Mon. 415.....	3.3 6,351.6 6,372.5	0.517440 3.802882 3.804313
Mon. 418.....	49 00 00.46 109 16 39.40	270 15 48	90 15 48	Mon. 418 ecc.....	1.9	0.275080
Enright.....	49 02 23.86 108 59 39.05	78 02 16 110 59 38 338 31 00 352 39 12	257 48 25 290 52 18 158 32 18 172 40 39	318..... Strong..... S-313..... West Cherry.....	21,200.1 12,651.1 5,702.4 18,331.3	4.326338 4.102129 3.756060 4.263194
Mon. 426.....	48 59 58.63 109 01 52.87	211 12 14 279 39 19 339 40 43	31 13 55 99 42 17 159 43 51	Enright..... S-313..... West Cherry.....	5,246.1 4,878.0 14,601.4	3.719833 3.688241 4.164394
Mon. 427.....	48 59 58.38 108 59 47.92	90 11 25 182 17 47 289 41 24	270 09 50 2 17 54 109 42 48	Mon. 426..... Enright..... S-313.....	2,539.7 4,497.9 2,409.7	3.404789 3.653010 3.381961



## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 428.....	48 59 58.12 108 57 39.38	23 10 48 90 11 22 90 12 11 151 38 29	203 10 35 270 09 45 270 09 00 331 36 59	S-313..... Mon. 427..... Mon. 426..... Enright.....	875.0 2,612.8 5,152.6 5,116.9	2.941990 3.417111 3.712024 3.709008
Mon. 442.....	48 59 58.01 108 31 23.14	55 43 48 150 42 40	235 40 39 330 39 58	Murray..... Telford.....	6,159.0 8,908.2	3.789511 3.949789
Mon. 444.....	48 59 58.12 108 28 25.64	89 57 48 134 18 17 223 54 58 291 26 46	269 55 34 314 13 20 43 58 30 111 29 44	Mon. 442..... Telford..... Tees..... Avery.....	3,607.9 11,124.2 8,221.1 5,158.0	3.557254 4.046267 3.914929 3.712481
Mon. 446.....	48 59 58.09 108 25 23.72	90 02 01 198 44 18 329 43 01	269 59 44 18 45 32 149 43 42	Mon. 444..... Tees..... Avery.....	3,697.7 6,251.8 2,185.1	3.567937 3.796008 3.339468
Mon. 449.....	48 59 58.49 108 18 51.55	74 35 00 89 57 10 349 20 36	254 30 45 269 52 14 169 20 59	Avery..... Mon. 446..... Betts.....	7,128.7 7,971.4 3,397.5	3.853010 3.901532 3.531165
Mon. 451.....	48 59 58.66 108 14 11.79	56 33 53 89 58 30	236 30 45 269 54 59	Betts..... Mon. 449.....	6,065.5 5,686.6	3.782866 3.754851
Mon. 453.....	48 59 58.71 108 10 33.69	21 17 40 70 38 14 90 00 16 117 12 36 165 03 49	201 16 32 250 32 22 269 57 31 297 06 31 345 02 39	White..... Betts..... Mon. 451..... Harding..... Raley.....	5,012.0 10,067.0 4,433.2 11,055.3 7,299.0	3.700015 4.002898 3.646716 4.043572 3.863266
Mon. 463.....	48 59 59.14 107 50 45.46	180 10 14 269 20 22 355 01 33	0 10 15 89 23 08 175 01 37	Cory..... Center XV..... Kerr.....	6,952.6 4,454.4 1,322.8	3.842148 3.648792 3.121490
Mon. 465.....	48 59 59.21 107 46 47.87	89 59 54 97 11 28 145 21 50 325 23 48	269 56 55 277 11 14 325 18 51 145 24 38	Mon. 463..... Center XV..... Cory..... Sowers.....	4,829.4 378.2 8,449.9 2,350.8	3.683893 2.577709 3.926854 3.372873
Mon. 473 ecc.....	48 59 58.24 107 33 25.34	108 24 27 121 17 20 220 36 09	288 11 23 301 09 26 40 38 19	Cory..... Waters..... Walsh.....	22,232.1 14,913.7 5,361.5	4.346980 4.173584 3.729288
Mon. 476.....	48 59 57.85 107 28 01.10	90 08 20 142 49 18 259 52 57	270 04 15 322 47 23 79 58 27	Mon. 473 ecc..... Walsh..... French.....	6,590.8 5,123.9 9,007.9	3.818940 3.709602 3.954625
Mon. 479.....	48 59 58.96 107 23 17.47	243 35 05 344 37 32	63 37 00 164 38 53	French..... Kennedy.....	3,466.1 8,286.5	3.539841 3.918372
Flag N. E. of Mon. 478.....	49 00 07.77 107 24 09.64	253 01 59 284 23 23	73 04 34 104 24 02	French..... Mon. 479.....	4,353.8 1,094.7	3.638868 3.039301
Flag S. E. of Mon. 478.....	48 59 47.64 107 24 30.10	213 46 49 247 32 56 256 40 17	33 47 04 67 35 46 76 41 12	Flag N. E. of Mon. 478..... French..... Mon. 479.....	748.0 4,955.7 1,517.2	2.873913 3.695106 3.181032
Flag east of Mon. 478.....	48 59 56.79 107 24 49.05	247 02 56 252 01 50 306 15 07	67 03 26 72 04 54 126 15 21	Flag N. E. of Mon. 478..... French..... Flag S. E. of Mon. 478.....	870.0 5,219.9 477.7	2.939520 3.717659 2.679199
Mon. 478.....	48 59 57.63 107 24 53.72	250 43 56 285 21 59 302 43 41	70 44 30 105 22 03 122 43 59	Flag N. E. of Mon. 478..... Flag east of Mon. 478..... Flag S. E. of Mon. 478.....	949.1 98.4 570.7	2.977332 1.992873 2.756436
Mon. 480.....	49 00 00.31 107 21 39.22	216 27 05 268 12 21 309 22 58	36 27 46 88 18 44 129 26 36	French..... Moulstead..... Long.....	1,864.3 10,321.4 7,592.9	3.270519 4.013738 3.880408
Rim.....	49 00 38.76 107 13 46.26	31 59 38 321 10 44	211 57 19 141 11 10	Long..... Moulstead.....	7,083.4 1,122.2	3.850239 3.050075
Nose.....	49 00 48.94 107 20 00.83	272 19 35 278 05 35 328 32 42	92 24 17 98 10 43 148 35 06	Rim..... Moulstead..... Long.....	7,618.2 8,400.3 7,410.8	3.881851 3.924293 3.869865
Martin.....	49 00 37.71 107 16 34.38	3 11 11 94 44 53 269 26 21	183 10 59 274 42 17 89 28 28	Long..... Nose..... Rim.....	5,985.5 4,209.5 3,416.7	3.777103 3.624235 3.533610
Chin.....	48 59 45.98 107 19 28.85	161 31 24 245 43 19 256 47 07 323 41 27	341 31 00 65 45 31 76 51 25 143 43 26	Nose..... Martin..... Rim..... Long.....	2,050.6 3,889.4 7,151.3 5,432.0	3.311891 3.589884 3.854388 3.734962
Mon. 481.....	49 00 00.25 107 19 17.91	26 46 24 149 53 43 250 46 59	206 46 16 329 53 11 70 49 02	Chin..... Nose..... Martin.....	493.6 1,738.8 3,519.2	2.693383 3.240256 3.546449
Mon. 482.....	49 00 00.20 107 17 04.62	81 29 45 112 49 23 207 55 48 253 31 00	261 27 56 292 47 10 27 56 11 73 33 30	Chin..... Nose..... Martin..... Rim.....	2,964.5 3,884.9 1,311.7 4,203.7	3.471947 3.583380 3.117838 3.623634

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 483.....	49 00 00.20 107 15 11.03	90 00 39 124 22 59 235 19 47	269 59 13 304 21 56 55 20 51	Mon. 482..... Martin..... Rim.....	2,308.8 2,052.5 2,094.6	3.363382 3.312286 3.321099
Mon. 484.....	49 00 00.23 107 13 10.58	99 17 26 176 04 22 318 19 16 355 58 36	279 11 43 356 04 21 138 23 25 175 59 02	French..... Moulstead..... Grave..... Lewis.....	9,350.8 316.8 10,095.2 9,807.7	3.970849 2.500748 4.004113 3.991565
Mon. 485.....	49 00 00.18 107 10 29.57	14 49 55 95 31 12 266 59 25 335 30 26	194 48 19 275 29 10 87 00 44 155 32 33	Lewis..... Moulstead..... N. 286-A..... Grave.....	10,118.8 3,309.5 2,129.1 8,287.3	4.005127 3.519760 3.328191 3.918414
Mon. 486.....	49 00 00.15 107 08 40.49	26 11 50 93 20 01 262 38 22 350 50 39	206 08 52 273 16 37 82 43 36 170 51 24	Lewis..... Moulstead..... Alkali..... Grave.....	10,898.7 5,520.6 8,523.5 7,638.9	4.037376 3.741985 3.930616 3.883031
Mon. 487.....	49 00 00.11 107 06 48.19	90 02 36 92 45 04 259 58 51	270 01 11 272 43 35 80 02 40	Mon. 486..... N. 286-A..... Alkali.....	2,282.7 2,376.5 6,266.5	3.358456 3.375934 3.797025
Mon. 488.....	49 00 00.06 107 03 56.35	90 02 37 90 03 28 91 09 16 247 52 39	270 00 27 269 59 53 271 05 38 67 54 19	Mon. 487..... Mon. 486..... N. 286-A..... Alkali.....	3,492.7 5,775.5 5,867.6 2,891.8	3.543167 3.761589 3.768461 3.461162
Mon. 489.....	49 00 00.03 107 01 36.16	171 07 12 318 48 53	351 07 06 138 50 40	Alkali..... Rabbit.....	1,102.5 4,369.8	3.042382 3.640463
Mon. 490.....	49 00 00.00 106 59 06.45	2 54 43 90 01 59 108 45 36	182 54 36 270 00 06 288 43 37	Rabbit..... Mon. 489..... Alkali.....	3,292.7 3,043.0 3,392.8	3.517554 3.483298 3.530560
Mon. 491.....	48 59 59.97 106 57 08.14	38 03 30 90 01 59 240 16 35 272 41 10	218 01 54 270 00 30 60 20 23 92 44 13	Rabbit..... Mon. 490..... Sage..... S. 282-A.....	4,174.6 2,404.8 7,064.1 4,920.1	3.620613 3.381076 3.849058 3.691977
Mon. 492.....	48 59 59.95 106 54 53.57	90 01 54 276 03 48	270 00 13 96 05 09	Mon. 491..... S. 282-A.....	2,735.3 2,191.5	3.437012 3.340748
Mon. 493.....	48 59 59.90 106 53 01.66	22 30 38 90 03 04 197 51 10 256 53 25	202 30 35 269 59 58 17 51 52 76 56 41	S. 282-A..... Mon. 491..... Sage..... Creek.....	249.6 5,010.1 3,678.6 5,405.6	2.397176 3.699845 3.565679 3.732846
Mon. 494.....	48 59 59.86 106 51 19.23	164 46 55 240 33 42 248 56 13	344 46 19 60 37 40 68 58 11	Sage..... Rocky..... Creek.....	3,630.2 7,364.6 3,411.2	3.559927 3.867152 3.532003
Mon. 495.....	48 59 59.84 106 49 08.46	87 19 04 90 01 25 213 13 21 226 05 10 323 10 04	267 16 05 269 59 46 23 13 41 46 07 30 143 11 36	S. 282-A..... Mon. 494..... Creek..... Rocky..... Hay.....	4,841.0 2,658.0 1,333.6 5,215.9 4,130.5	3.684937 3.424553 3.125014 3.717333 3.616001
Mon. 496.....	48 59 59.84 106 47 37.12	90 00 54 132 39 29 207 44 22	269 59 45 312 38 40 27 45 33	Mon. 495..... Creek..... Rocky.....	1,856.6 1,809.0 4,086.5	3.268721 3.257443 3.611355
Mon. 497.....	48 59 59.69 106 45 28.74	31 06 53 90 05 02 168 58 16 321 58 58	211 05 39 270 02 16 348 57 50 141 59 04	Hay..... Mon. 495..... Rocky..... S. 280.....	3,856.2 4,466.2 3,689.3 273.0	3.586163 3.649836 3.566946 2.436163
Mon. 498.....	48 59 59.56 106 43 45.77	142 20 55 247 08 11 301 04 33	322 19 11 67 11 52 121 06 17	Rocky..... Smoky..... Iron.....	4,579.3 6,458.3 3,282.7	3.660801 3.810118 3.516237
Mon. 499.....	48 59 59.46 106 42 11.30	90 06 31 127 35 13 238 05 08	270 05 23 307 32 18 58 07 37	Mon. 498..... Rocky..... Smoky.....	1,920.1 5,951.6 4,749.6	3.283335 3.774632 3.676654
Mon. 500.....	48 59 59.43 106 40 16.99	40 17 10 117 18 18 214 14 54	220 16 17 297 13 57 34 15 57	Iron..... Rocky..... Smoky.....	2,216.7 7,920.7 3,037.0	3.345698 3.898764 3.482449
Mon. 501.....	48 59 59.43 106 38 44.98	62 54 40 176 20 54	242 52 37 356 20 48	Iron..... Smoky.....	3,711.2 2,515.4	3.569516 3.400610
Mon. 502.....	48 59 59.42 106 36 30.76	74 22 23 90 01 01 90 01 38 131 00 58 254 48 53 335 24 12	254 18 39 269 59 19 269 58 47 310 59 07 74 51 45 155 25 15	Iron..... Mon. 501..... Mon. 500..... Smoky..... Burnt..... Cone.....	6,264.8 2,728.3 4,598.5 3,826.5 4,803.8 4,998.0	3.796907 3.435892 3.662619 3.582806 3.681543 3.612568
Mon. 503.....	48 59 59.13 106 34 24.35	13 06 18 78 58 53 90 12 48	193 05 46 258 53 34 270 11 13	Cone..... Iron..... Mon. 502.....	3,816.7 8,765.0 2,569.4	3.581692 3.942750 3.409830

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 504.....	48 59 58.87 106 32 31.60	40 25 31 81 19 21 170 01 15 267 32 16	220 23 34 261 12 36 350 01 06 87 33 22	Cone..... Iron..... Burnt..... N. 276.....	4,871.3 11,022.1 1,293.2 1,770.0	3.687642 4.042265 3.111651 3.247982
Mon. 505.....	48 59 58.64 106 31 03.19	15 51 23 53 15 39 90 13 43 160 57 29	195 50 37 233 12 35 270 12 36 340 57 28	Gravel..... Cone..... Mon. 504..... N. 276.....	4,531.9 6,185.6 1,797.0 87.43	3.656279 3.791384 3.254540 1.941660
Fire.....	48 58 52.18 106 28 06.74	64 29 08 120 35 27 252 25 07	244 26 09 300 33 13 72 26 19	Gravel..... N. 276..... Fox.....	5,349.3 4,199.5 2,020.7	3.728295 3.622518 3.305499
Mon. 506.....	48 59 58.56 106 28 59.79	91 56 20 295 36 13 332 15 28	271 54 46 115 38 04 152 16 08	N. 276..... Fox..... Fire.....	2,538.4 3,331.9 2,316.9	3.404558 3.522687 3.364908
Mon. 507.....	48 59 58.45 106 26 39.22	41 00 12 90 58 10 354 10 01	220 59 06 270 54 50 174 10 07	Fire..... N. 276..... Fox.....	2,712.5 5,394.8 1,444.8	3.433366 3.731974 3.159797
Mon. 508.....	48 59 58.35 106 24 29.07	60 09 34 90 04 38 264 29 44	240 08 01 270 03 00 84 33 36	Fox..... Mon. 507..... Badger.....	2,881.5 2,645.6 6,286.7	3.459613 3.422518 3.798420
Mon. 509.....	48 59 58.15 106 21 42.86	40 07 01 76 22 27 90 07 24 258 06 24	220 04 28 256 18 49 270 05 18 78 08 11	Kid..... Fox..... Mon. 508..... Badger.....	6,409.7 6,048.8 3,378.3 2,942.9	3.806837 3.781672 3.525699 3.468779
Mon. 510.....	48 59 58.02 106 19 23.63	80 45 33 184 40 33 246 27 38 329 33 20	260 40 09 4 40 35 66 31 30 149 34 34	Fox..... Badger..... Brace..... Branch.....	8,824.0 612.0 6,796.9 3,934.0	3.945665 2.786785 3.832312 3.594839
Flag south of Mon. 513.....	48 59 43.75 106 14 02.80	99 15 19 174 48 01 259 42 57	279 11 19 354 47 50 79 44 09	Badger..... Brace..... Coal.....	6,556.0 3,164.7 1,976.6	3.816642 3.500339 3.295908
Flag north of Mon. 513.....	49 01 03.44 106 13 26.69	16 36 23 78 57 20 124 04 19 330 08 24	196 35 56 258 52 53 304 03 41 150 09 09	Flag south of Mon. 513..... Badger..... Brace..... Coal.....	2,508.7 7,340.6 1,232.0 2,431.7	3.409710 3.865733 3.090620 3.385918
Mon. 511.....	48 59 57.90 106 17 54.55	238 26 04 249 34 16 275 16 33 356 55 57	58 28 48 69 37 38 95 19 28 176 56 04	Brace..... Flag north of Mon. 513..... Flag south of Mon. 513..... Branch.....	5,189.3 5,808.0 4,731.0 3,393.2	3.715108 3.764025 3.674955 3.530608
Mon. 512.....	48 59 57.80 106 16 21.06	26 56 04 90 06 01 90 07 18 99 34 49 222 51 22 270 57 25	206 55 00 270 04 50 270 05 01 279 32 33 42 52 56 91 00 22	Branch..... Mon. 511..... Mon. 510..... Badger..... Brace..... Coal.....	3,796.9 1,900.3 3,711.0 3,712.5 3,708.1 4,755.8	3.579433 3.278828 3.569495 3.569665 3.569153 3.677224
Mon. 513.....	48 59 57.62 106 13 43.82	41 59 41 95 13 10 189 43 03	221 59 27 275 08 55 9 43 16	Flag south of Mon. 513..... Badger..... Flag north of Mon. 513.....	576.7 6,885.0 2,662.6	2.760915 3.837903 3.314416
Mon. 514.....	48 59 57.71 106 12 07.05	79 04 25 135 53 00 207 21 43 227 01 59 316 26 09	259 04 10 315 51 22 27 23 20 47 03 43 130 27 30	Coal..... Brace..... Slim..... Jeff..... Windy.....	415.5 3,790.2 5,672.4 3,815.7 2,875.3	2.618586 3.578657 3.753765 3.581570 3.458679
Day.....	48 58 57.20 106 08 59.27	90 08 46 167 06 24 263 18 04	270 07 46 347 05 46 83 19 29	Windy..... Jeff..... Noon.....	1,629.8 4,584.9 2,324.2	3.212125 3.661330 3.366272
Mon. 515.....	48 59 57.79 106 10 30.72	197 49 13 290 59 44 315 10 54	17 49 44 111 02 19 135 12 03	Jeff..... Noon..... Day.....	2,728.5 4,464.2 2,638.2	3.435920 3.649741 3.421307
Mon. 516.....	48 59 57.92 106 08 25.19	20 16 33 51 08 41 89 55 37 314 48 27	200 16 07 231 07 14 269 54 02 134 49 27	Day..... Windy..... Mon. 515..... Noon.....	1,999.4 2,982.6 2,551.6 2,277.0	3.300899 3.474593 3.406809 3.357365
Mon. 517.....	48 59 58.04 106 06 17.68	31 16 46 60 14 41 69 08 19 314 25 28	211 16 10 240 12 39 249 05 17 134 27 43	Noon..... Day..... Windy..... Bostick.....	1,882.2 3,784.8 5,260.3 5,111.3	3.274663 3.578038 3.721014 3.708531
Mon. 518.....	48 59 58.13 106 04 22.27	64 08 49 89 56 31 127 27 20 254 03 23 340 00 30	244 06 46 269 55 04 307 25 13 74 04 44 160 01 18	Noon..... Mon. 517..... Kick..... N. 268..... Bostick.....	3,693.4 2,345.8 4,298.6 2,256.0 3,811.3	3.567429 3.370298 3.633327 3.353339 3.581074
Mon. 519.....	48 59 58.22 106 02 34.59	13 54 01 89 56 18 115 00 55 178 12 44	193 53 28 269 54 57 294 57 27 358 12 43	Bostick..... Mon. 518..... Kick..... N. 268.....	3,692.7 2,188.7 6,179.7 616.8	3.567339 3.340187 3.790967 2.790137

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 520.....	48 59 58.32 106 00 38.84	89 56 08 104 30 37 262 54 18	269 54 41 284 29 09 82 56 12	Mon. 519..... N. 268..... N. 267.....	2,352.8 2,450.0 3,099.1	3.371593 3.389162 3.491236
Mon. 521.....	48 59 58.44 105 58 36.56	81 09 08 89 55 39 97 10 44 237 20 23	261 02 43 269 54 07 277 07 44 57 20 45	Noon..... Mon. 520..... N. 268..... N. 267.....	10,477.5 2,485.4 4,895.4 700.9	4.020256 3.395403 3.689785 2.845674
Mon. 522.....	48 59 58.54 105 56 40.73	0 28 47 102 01 01	180 28 47 281 59 55	Black = Green N. base..... N. 267.....	440.7 1,803.7	2.644114 3.256165
Mon. 523.....	48 59 58.64 105 54 38.81	79 52 28 254 25 09 323 06 18	259 50 56 74 26 22 143 07 19	Black = Green N. base..... Sod..... Nick.....	2,521.3 2,033.4 2,769.3	3.401630 3.306233 3.442375
Mon. 524.....	48 59 58.76 105 52 37.16	89 55 58 136 33 07	269 54 26 316 32 48	Mon. 523..... Sod.....	2,472.8 747.1	3.393181 2.873386
Mon. 525.....	48 59 58.86 105 50 39.68	89 56 11 233 29 52 280 44 15	269 54 43 53 33 19 100 44 34	Mon. 524..... Lost..... Mud.....	2,387.8 6,949.6 508.9	3.377997 3.841957 2.706662
Mon. 526.....	48 59 58.94 105 48 50.46	86 45 43 89 56 27 219 12 02 283 17 20	266 44 39 269 55 05 39 14 07 103 19 33	Mud..... Mon. 525..... Lost..... Harris.....	1,722.7 2,220.0 5,328.8 3,670.5	3.236215 3.346345 3.726626 3.564724
Mon. 527.....	48 59 59.06 105 46 42.95	88 40 51 89 56 18 190 40 50 310 52 41	268 38 11 269 54 42 10 41 19 130 53 17	Mud..... Mon. 526..... Lost..... Harris.....	4,313.1 2,591.9 4,197.8 1,296.0	3.634785 3.413619 3.623023 3.112604
Mon. 528.....	48 59 59.17 105 44 44.76	19 52 10 59 05 39 89 55 30	199 51 04 239 04 46 269 54 01	Child..... Harris..... Mon. 527.....	5,257.4 1,658.3 2,402.4	3.720772 3.219654 3.380638
Mon. 529.....	48 59 59.28 105 42 45.02	40 29 19 77 31 06 89 56 14	220 26 43 257 28 43 269 54 43	Child..... Harris..... Mon. 528.....	6,503.8 3,950.4 2,433.8	3.813165 3.596639 3.386292
Mon. 530.....	48 59 59.18 105 40 55.87	52 31 01 82 02 48 90 01 14 90 05 12 222 45 35 296 35 05	232 27 02 261 59 03 269 58 21 270 03 50 42 46 28 116 36 11	Child..... Harris..... Mon. 528..... Mon. 529..... Middle..... Fork.....	8,120.1 6,135.0 4,652.5 2,218.7 2,070.8 1,993.8	3.909559 3.787817 3.667687 3.346093 3.317390 3.299678
Mon. 531.....	48 59 59.06 105 38 50.02	143 06 27 240 31 16 284 27 01	323 05 44 60 34 02 104 28 57	Middle..... Poplar..... Scobey.....	1,911.4 5,132.3 3,238.1	3.281347 3.710308 3.510285
Mon. 532.....	48 59 58.91 105 36 31.25	76 12 22 82 02 48 111 08 41 213 06 09 338 38 31	256 10 08 270 04 33 291 06 13 33 07 10 158 38 43	Fork..... Mon. 531..... Middle..... Poplar..... Scobey.....	3,703.4 2,820.6 4,253.7 3,018.4 863.8	3.568605 3.450349 3.628766 3.479776 2.936393
Mon. 533.....	48 59 58.80 105 35 03.90	10 27 20 61 16 32 90 07 13 177 08 40 209 32 43	190 27 14 241 15 38 270 06 07 357 08 35 29 33 34	Break..... Scobey..... Mon. 532..... Poplar..... Knoll.....	874.7 1,696.3 1,775.6 2,534.8 2,782.2	2.941872 3.221749 3.249335 3.403950 3.444396
Mon. 534.....	48 59 58.72 105 33 36.92	66 00 51 90 05 31 170 44 16 241 57 54 275 05 00	245 59 40 270 04 26 350 44 02 61 59 42 95 06 58	Break..... Mon. 533..... Knoll..... Din..... Coy.....	2,109.0 1,767.8 2,454.9 3,302.4 3,189.9	3.324069 3.247443 3.390029 3.518836 3.503771
Mon. 535.....	48 59 58.58 105 31 04.21	80 24 01 90 05 49 124 46 11 173 05 55 324 32 21 345 20 22	260 20 54 270 03 54 304 44 01 353 05 48 144 33 36 165 20 25	Break..... Mon. 534..... Knoll..... Din..... Nice..... Coy.....	5,102.9 3,104.1 4,258.2 1,567.2 3,476.4 288.6	3.707817 3.491939 3.629222 3.195115 3.541127 2.460232
Mon. 536.....	48 59 58.47 105 29 14.69	82 42 40 90 05 51 245 15 29 289 00 23	262 41 20 270 04 28 65 18 26 109 04 00	Coy..... Mon. 535..... Fee..... Har.....	2,170.7 2,226.0 5,255.4 6,160.2	3.336590 3.347531 3.720906 3.789593
Mon. 537.....	48 59 58.38 105 27 44.66	35 50 49 90 05 29 110 13 32 233 12 53 296 39 42	215 49 34 270 04 21 290 10 55 53 14 42 116 42 10	Nice..... Mon. 536..... Din..... Fee..... Har.....	3,485.9 1,830.1 4,522.2 3,675.4 4,468.7	3.542310 3.262474 3.655345 3.565307 3.650183
Mon. 538.....	48 59 58.20 105 25 59.47	55 59 05 90 06 51 103 48 34 200 06 12 317 12 24	235 56 30 270 03 01 283 44 37 20 06 42 137 13 33	Nice..... Mon. 535..... Din..... Fee..... Har.....	5,043.6 6,194.2 6,570.7 2,346.1 2,790.1	3.702738 3.791986 3.817611 3.370340 3.436185

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 539.....	48 59 58.18 105 24 07.06	12 09 28 90 05 53 146 11 41 263 14 01	192 09 12 270 04 28 326 10 46 83 15 26	Har..... Mon. 538..... Fee..... Ray = Ogden N. W. base.....	2,046.1 2,284.8 2,655.7 2,320.8	3.310936 3.358857 3.424180 3.365634
Mon. 540.....	48 59 58.05 105 22 01.54	56 13 19 90 06 46 138 18 09 183 40 03 332 45 19	236 11 28 270 03 46 318 17 59 3 40 08 152 45 41	Har..... Mon. 538..... Ray = Ogden N. W. base..... Fil..... Ogden S. E. base.....	3,589.2 4,836.3 370.9 2,124.9 1,325.3	3.554994 3.684514 2.569252 3.327341 3.122303
Mon. 541.....	48 59 57.91 105 19 54.84	59 12 08 90 06 24 131 04 31 248 24 35 284 55 58	239 10 55 270 04 48 311 03 01 68 27 59 105 00 19	Ogden S. E. base..... Mon. 540..... Fil..... Neil..... Merril.....	2,292.4 2,575.3 3,234.6 5,906.9 7,289.6	3.360290 3.410825 3.509818 3.771360 3.862706
Mon. 542.....	48 59 57.80 105 17 50.11	75 27 28 90 05 42 113 11 34 292 36 50	255 24 41 270 04 08 293 08 29 112 39 37	Ogden S. E. base..... Mon. 541..... Fil..... Merril.....	4,654.1 2,535.4 5,410.0 4,882.6	3.667840 3.404044 3.733198 3.688652
Uffurd.....	49 00 14.10 105 15 26.24	181 11 39 256 25 33 326 25 09	1 11 40 76 29 42 146 26 08	Neil..... Spring..... Merril.....	1,671.3 6,904.0 2,859.9	3.223046 3.839100 3.450348
Colln.....	48 59 39.12 105 15 00.53	154 11 18 169 57 02 246 25 42 320 52 56	334 10 58 349 56 44 66 29 32 140 53 35	Uffurd..... Neil..... Spring..... Merril.....	1,200.1 2,794.2 6,752.1 1,678.6	3.079228 3.446252 3.829441 3.224949
Mon. 543.....	48 59 57.66 105 15 51.74	225 36 03 298 48 35	45 36 22 118 49 13	Uffurd..... Colln.....	725.6 1,188.3	2.860696 3.074911
Met.....	49 00 01.07 105 13 33.17	69 06 47 99 56 41 132 30 31 245 24 11	249 05 41 279 55 16 312 29 07 65 26 55	Colln..... Uffurd..... Neil..... Spring.....	1,900.7 2,333.0 3,069.1 4,854.3	3.278912 3.367924 3.487013 3.686127
Mon. 544.....	48 59 57.53 105 13 49.97	68 22 44 90 06 21 104 39 52 138 38 54 245 52 12 252 15 18	248 21 51 270 04 49 284 38 39 318 37 43 65 55 09 72 15 31	Colln..... Mon. 543..... Uffurd..... Neil..... Spring..... Met.....	1,542.9 2,475.3 2,022.5 2,907.9 5,210.4 358.4	3.188340 3.393626 3.305890 3.463586 3.716868 2.554422
Mon. 545.....	48 59 57.51 105 13 25.48	90 04 28 125 05 53	270 04 09 305 05 47	Mon. 544..... Met.....	497.7 191.1	2.696994 2.281197
Bully.....	49 00 04.18 105 12 11.20	48 56 56 116 44 03 235 00 54 302 28 40	228 55 27 296 41 37 55 02 36 122 30 13	Merril..... Neil..... Spring..... Hearst.....	3,161.2 4,398.2 3,354.4 2,958.6	3.499850 3.643275 3.525609 3.471084
Mon. 546.....	48 59 57.38 105 11 01.10	98 23 27 211 49 42	278 22 34 31 50 32	Bully..... Spring.....	1,440.3 2,510.2	3.158460 3.399709
Mon. 547.....	48 59 57.27 105 08 48.54	49 44 48 90 05 22 92 59 20 147 20 11 253 28 42	229 43 48 270 03 42 272 56 47 327 11 20 73 30 00	Hearst..... Mon. 546..... Bully..... Spring..... Pull.....	2,128.6 2,694.4 4,124.8 2,537.6 2,209.2	3.328097 3.430467 3.615407 3.404428 3.344244
Mon. 548.....	48 59 57.23 105 07 08.28	69 26 54 90 02 38 187 16 45 230 26 54	249 24 38 270 01 22 7 16 48 56 30 26	Hearst..... Mon. 547..... Pull..... Mervin.....	3,911.9 2,037.9 634.2 6,848.9	3.592392 3.309186 2.802195 3.835619
Mon. 549.....	48 59 57.16 105 04 45.49	34 12 16 90 03 21 102 37 16 216 33 47	214 11 30 270 01 33 282 35 32 36 35 31	Pebble..... Mon. 548..... Pull..... Mervin.....	2,169.5 2,902.4 2,891.6 4,712.6	3.336350 3.462761 3.461144 3.673259
Mon. 551.....	48 59 57.07 105 01 08.08	38 34 50 95 02 29 156 59 09	218 33 46 274 58 00 336 58 09	Beaver..... Pull..... Mervin.....	2,756.2 7,268.5 4,115.1	3.440317 3.861446 3.614379
Mon. 550.....	48 59 57.11 105 03 02.83	190 47 48 270 01 04	10 48 15 90 02 31	Mervin..... Mon. 551.....	3,854.4 2,332.4	3.585955 3.367810
Mon. 552.....	48 59 57.04 104 59 41.70	58 13 22 90 02 25 138 24 28 232 41 46 292 42 24	238 11 13 270 01 20 318 22 23 52 44 50 112 45 10	Beaver..... Mon. 551..... Mervin..... Pasture..... Robinson.....	4,088.1 1,755.8 5,066.7 6,202.3 4,858.7	3.611519 3.244465 3.704724 3.792550 3.686520
Mon. 553.....	48 59 56.94 104 57 27.22	90 04 34 121 54 18 210 21 07 316 59 59	270 02 53 301 50 32 30 22 29 137 01 03	Mon. 552..... Mervin..... Pasture..... Robinson.....	2,733.6 7,179.8 4,357.3 2,502.5	3.436730 3.856111 3.639213 3.408664
Mon. 554.....	48 59 56.83 104 54 52.51	36 46 35 90 05 39 112 22 25 231 37 45	216 45 43 270 02 01 292 16 42 51 41 04	Robinson..... Mon. 552..... Mervin..... Giles.....	2,335.4 5,878.3 9,989.7 6,783.8	3.368357 3.769254 3.999551 3.831474

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 555.....	48 59 56.73 104 52 28.81	66 38 15 90 04 25 134 18 25 209 40 25	246 35 35 270 02 36 314 16 01 29 41 55	Robinson..... Mon. 554..... Pasture..... Giles.....	4,705.9 2,920.9 5,393.7 4,847.7	3.672641 3.465518 3.731887 3.685535
Davis.....	48 58 45.34 104 49 00.56	92 18 16 126 27 38 164 05 07 225 29 37	272 12 59 306 22 37 344 03 59 45 30 53	Robinson..... Pasture..... Giles..... Zemper.....	8,561.3 10,058.6 6,673.0 2,864.0	3.932538 4.002537 3.824318 3.456980
Mon. 556.....	48 59 56.66 104 50 16.00	75 09 12 90 03 47 119 54 38 325 09 00	255 04 51 270 02 07 299 50 35 145 09 57	Robinson..... Mon. 555..... Pasture..... Davis.....	7,263.0 2,609.6 7,565.2 2,084.4	3.861116 3.431293 3.878818 3.428840
Mon. 557.....	48 59 56.00 104 48 16.60	78 53 21 90 03 26 112 48 31 147 08 48 279 34 36	258 47 31 270 01 56 292 42 57 327 07 07 90 35 19	Robinson..... Mon. 556..... Pasture..... Giles..... Zemper.....	9,628.8 2,427.0 9,744.9 5,019.1 1,165.1	3.983574 3.385071 3.988776 3.700623 3.066346
Mon. 558.....	48 59 56.50 104 45 48.45	84 09 27 90 04 24 117 13 39 168 26 12 305 06 38	264 08 18 270 02 32 297 12 43 348 25 38 125 06 48	Zemper..... Mon. 557..... Look..... Carlisle..... Johnson.....	1,872.3 3,011.3 1,705.7 4,529.7 323.9	3.272381 3.478750 3.231896 3.656069 2.510435
Mon. 559.....	48 59 56.46 104 44 53.09	77 51 30 90 03 52 155 24 02 220 50 20 264 30 17	257 50 58 270 03 10 335 22 46 40 51 47 84 31 12	Johnson..... Mon. 558..... Carlisle..... Lump..... Out.....	880.0 1,125.3 4,882.3 3,566.0 1,492.1	2.944497 3.051263 3.688626 3.552181 3.173798
Mon. 560.....	48 59 56.41 104 43 18.55	90 03 29 108 18 17 188 39 54 228 36 14 269 13 26	270 02 17 288 18 01 8 40 09 48 38 59 89 15 56	Mon. 559..... Out..... Lump..... Rose..... Guard.....	1,921.6 459.5 2,730.2 5,918.7 4,037.8	3.283652 2.662206 3.436187 3.772226 3.606150
Bob.....	49 00 25.38 104 41 36.48	218 06 25 293 12 22	38 07 53 113 13 35	Rose..... Guard.....	3,834.9 2,135.5	3.583749 3.329193
Mon. 561.....	48 59 56.33 104 41 04.24	90 03 41 143 51 35 203 37 03 225 43 01 267 33 47	270 01 59 323 51 10 23 38 07 45 45 37 87 34 35	Mon. 560..... Bob..... Rose..... Rood..... Guard.....	2,730.2 1,111.1 4,272.4 5,891.6 1,308.5	3.436197 3.045768 3.630772 3.770234 3.116764
Mon. 562.....	48 59 56.52 104 39 08.31	89 52 14 92 42 56 106 30 18 170 39 23 253 27 06 264 23 20	269 50 46 272 42 17 286 28 26 350 38 59 73 27 58 84 25 57	Mon. 561..... Guard..... Bob..... Rose..... In..... Fly.....	2,356.4 1,050.3 3,140.7 3,961.0 1,467.7 4,240.4	3.372251 3.021304 3.497033 3.597810 3.166640 3.627402
Mon. 563.....	48 59 56.67 104 37 44.97	89 51 20 145 13 40 242 46 19 260 48 08 280 11 10	269 50 17 325 13 30 62 49 32 80 49 42 100 13 48	Mon. 562..... In..... Wild..... Fly..... Berry.....	1,694.0 503.2 5,825.3 2,559.1 4,312.3	3.228921 2.701740 3.765320 3.408080 3.634704
Mon. 564.....	48 59 56.86 104 35 49.79	89 52 04 98 49 33 204 41 30 226 53 47 292 01 38	269 50 37 278 47 56 24 41 37 46 55 33 112 02 48	Mon. 563..... In..... Fly..... Wild..... Berry.....	2,341.2 2,659.5 443.1 3,889.4 2,052.5	3.369446 3.424806 2.646496 3.589881 3.312293
Mon. 565.....	48 59 57.05 104 33 59.04	24 12 06 89 51 45 94 43 49 100 52 50 295 05 47	204 11 53 269 50 22 274 40 48 280 51 33 115 08 33	Berry..... Mon. 564..... In..... Fly..... View.....	850.7 2,251.2 4,895.7 2,103.7 4,946.2	2.929800 3.352411 3.689817 3.322991 3.694273
Mon. 566.....	48 59 57.18 104 32 36.96	235 37 51 306 48 33	55 40 31 126 50 17	Man..... View.....	5,234.8 3,510.0	3.718901 3.545313
Mon. 567.....	48 59 57.44 104 30 05.30	89 52 09 202 49 32	269 50 15 22 50 18	Mon. 566..... Man.....	3,082.7 3,196.0	3.488935 3.504610
Mon. 568.....	48 59 57.56 104 28 44.21	42 16 05 83 20 34 89 52 23 172 06 41 253 23 25 304 08 12	222 14 54 263 16 23 269 51 22 352 06 26 73 25 50 124 10 46	View..... Berry..... Mon. 567..... Man..... White..... Chap.....	2,858.4 6,794.9 1,648.3 2,969.8 4,076.9 5,033.6	3.456118 3.832181 3.217037 3.472732 3.610335 3.701880
Mon. 569 ecc.....	48 59 59.94 104 27 16.85	59 23 48 87 38 19 142 44 15 242 53 46 320 30 09	239 21 31 267 37 13 322 42 54 62 55 06 140 31 38	View..... Mon. 568..... Man..... White..... Chap.....	4,297.5 1,777.2 3,604.4 2,394.5 3,757.2	3.633215 3.249736 3.556833 3.379209 3.574865
Mon. 569.....	48 59 57.72 104 27 14.13	141 12 51 320 29 10	321 12 49 140 30 37	Mon. 569 ecc..... Chap.....	88.20 3,669.0	1.945469 3.564549

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 570.....	48 59 57.88 104 25 33.34	69 54 48 89 52 09 181 23 14 264 28 18 354 16 04	249 51 12 269 50 53 1 23 15 84 32 16 174 16 14	View..... Mon. 569..... White..... Thompson..... Chap.....	6,179.6 2,048.7 1,154.5 6,444.0 2,850.3	3.790959 3.311487 3.062410 3.809158 3.454895
Mon. 571.....	48 59 58.08 104 23 39.25	35 36 38 89 51 28 116 37 44 261 29 44 303 42 58	215 35 22 269 50 02 296 36 19 81 32 16 123 46 06	Chap..... Mon. 570..... White..... Thompson..... Blondie.....	3,495.7 2,318.9 2,562.3 4,140.9 6,092.8	3.543531 3.365289 3.408625 3.617098 3.784815
Mon. 572.....	48 59 58.26 104 21 55.64	55 30 27 89 51 39 253 04 03	235 27 53 269 50 21 73 05 17	Chap..... Mon. 571..... Thompson.....	5,026.1 2,106.0 2,079.8	3.701235 3.323468 3.318012
Mon. 573.....	48 59 58.47 104 19 53.16	89 51 47 99 24 11 140 09 18 264 04 26 352 07 46	269 50 14 279 19 55 320 09 00 104 08 03 172 08 03	Mon. 572..... White..... Thompson..... Round..... Blondie.....	2,489.6 6,979.0 780.0 6,021.2 3,428.6	3.396135 3.843791 2.892096 3.779680 3.535115
Mon. 574.....	48 59 58.71 104 17 31.00	35 28 16 89 52 00 99 54 53 242 23 14 296 32 56	215 24 46 269 50 13 279 52 48 62 24 36 116 34 45	Blondie..... Mon. 573..... Thompson..... High..... Round.....	4,177.1 2,889.7 3,440.5 2,511.5 3,297.7	3.620873 3.460851 3.536622 3.399933 3.518214
Mon. 575.....	48 59 58.84 104 16 15.52	49 16 41 89 51 46 96 49 48 316 14 54	229 14 14 269 50 49 276 46 45 136 15 46	Blondie..... Mon. 574..... Thompson..... Round.....	5,221.2 1,534.2 4,958.3 2,046.7	3.717773 3.185882 3.095337 3.311061
Mon. 576.....	48 59 58.99 104 14 45.30	15 46 00 89 51 37 135 19 54 298 13 54	195 45 44 269 50 29 315 19 11 118 15 04	Round..... Mon. 575..... High..... Cut.....	1,541.4 1,833.7 1,624.2 2,140.5	3.187908 3.263334 3.210628 3.330515
Dahl.....	49 00 36.82 104 12 54.81	9 23 07 45 09 11 89 47 22 289 17 49 329 13 43	189 22 53 225 07 32 269 45 16 109 19 51 149 15 52	Cut..... Round..... High..... Mon. 579..... Knote.....	2,210.9 3,759.4 3,387.3 3,488.8 6,807.1	3.344568 3.575122 3.529855 3.542670 3.832960
Ulan.....	48 59 35.88 104 12 27.49	71 56 07 163 34 15 255 04 57	251 55 33 343 33 54 75 06 38	Cut..... Dahl..... Mon. 579.....	963.3 1,962.7 2,833.0	2.983779 3.292848 3.452248
Mon. 577.....	48 59 59.14 104 13 21.52	54 58 18 89 51 06 112 01 49 205 00 15 269 49 57 303 11 52 349 50 00	234 56 59 269 50 03 292 00 04 25 00 35 89 52 19 123 12 33 169 50 07	Round..... Mon. 576..... High..... Dahl..... Mon. 579..... Ulan..... Cut.....	2,501.8 1,703.1 3,068.6 1,284.2 3,835.7 1,312.5 1,033.8	3.413606 3.231240 3.486936 3.106618 3.583840 3.118093 3.014420
Mon. 578.....	48 59 59.31 104 11 40.42	52 53 29 89 51 53 127 28 20 269 50 27	232 52 54 269 50 37 307 27 24 89 51 33	Ulan..... Mon. 577..... Dahl..... Mon. 579.....	1,199.8 2,054.9 1,904.7 1,780.8	3.070115 3.312781 3.279817 3.250619
Mon. 580.....	48 59 59.69 104 08 12.63	25 38 51 89 50 57 258 51 10	205 37 27 269 49 27 78 54 14	Knote..... Mon. 579..... Deal.....	5,216.4 2,442.8 5,054.3	3.717370 3.387893 3.703660
Mon. 581.....	48 59 59.86 104 06 39.82	41 22 30 89 50 53 336 45 51	221 19 56 269 49 43 156 46 47	Knote..... Mon. 580..... Finley.....	6,272.2 1,886.4 3,850.3	3.797421 3.275639 3.585491
Mon. 582.....	48 59 59.65 104 04 14.07	22 15 43 56 33 13 90 08 31 186 28 04	202 14 49 236 28 50 270 06 41 6 28 08	Finley..... Knote..... Mon. 581..... Deal.....	3,815.9 8,522.3 2,962.7 982.4	3.581592 3.930558 3.471690 2.992304
Mon. 583 ecc.....	48 59 59.52 104 02 48.15	42 09 31 120 56 31 265 00 30 307 44 50	222 07 33 300 55 31 85 04 49 127 48 25	Finley..... Deal..... Foster..... Fine.....	4,757.5 1,906.8 6,995.1 7,322.2	3.677378 3.280315 3.844796 3.864642
Mon. 583, Montana-North Dakota Boundary.	48 59 59.53 104 02 53.49	122 41 59 270 07 21	302 41 02 90 07 25	Deal..... Mon. 583 ecc.....	1,814.4 108.7	3.258723 2.036182
Mon. 584.....	48 59 59.36 104 01 01.01	56 46 00 90 08 44 104 30 30 262 43 39 321 07 46	236 42 40 270 07 23 284 28 08 82 46 37 141 10 00	Finley..... Mon. 583 ecc..... Deal..... Foster..... Fine.....	6,422.6 2,177.6 3,938.3 4,830.1 5,753.2	3.807708 3.337977 3.595305 3.683959 3.759909
Mon. 585 ecc.....	48 59 57.07 103 59 57.45	93 07 50 258 59 14 332 16 34	273 07 02 79 01 24 152 18 00	Mon. 584..... Foster..... Fine.....	1,294.0 3,565.0 4,981.3	3.111947 3.552055 3.697339
Mon. 585.....	48 59 59.26 103 59 59.08	90 08 38 333 47 06	270 07 51 153 47 07	Mon. 584..... Mon. 585 ecc.....	1,258.9 75.25	3.099981 1.876483

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 586.....	48 59 59.11 103 58 22.50	88 08 36 98 04 13 248 32 03 355 04 07	268 07 24 277 59 52 68 33 01 175 04 22	Mon. 585 ecc..... Deal..... Foster..... Fine.....	1,930.9 7,104.4 1,686.7 4,489.4	3.285760 3.851527 3.227026 3.652188
Mon. 587 ecc.....	48 59 56.53 103 55 57.45	30 16 48 91 33 36 116 48 52 268 35 20	210 15 13 271 31 47 296 48 01 88 38 58	Fine..... Mon. 586..... Foster..... Flew.....	5,066.6 2,949.4 1,544.4 5,869.8	3.706431 3.469740 3.188768 3.768620
Mon. 587.....	48 59 58.90 103 55 57.43	0 20 08	180 20 08	Mon. 587 ecc.....	73.10	1.863923
Mon. 588 ecc.....	48 59 58.41 103 53 53.62	88 41 32 99 19 44 268 33 24 300 58 41	268 39 59 279 17 20 88 35 28 121 03 24	Mon. 587 ecc..... Foster..... Skermo.....	2,517.6 3,947.2 3,352.1 8,907.3	3.400994 3.596293 3.525321 3.949747
Mon. 588.....	48 59 58.70 103 53 34.28	88 41 47	268 41 32	Mon. 588 ecc.....	393.35	2.594779
Mon. 589.....	48 59 58.49 103 51 02.31	89 58 36 121 41 25 267 39 49	269 56 27 301 41 20 87 43 26	Mon. 588 ecc..... Flew..... Fled.....	3,482.2 154.05 5,851.8	3.541854 2.187670 3.767291
Cairn south of Skermo.....	48 56 25.12 103 49 26.58	101 32 29 140 31 44 162 42 41 227 47 33	281 25 59 320 28 23 342 41 24 47 48 55	Fine..... Mon. 588 ecc..... Flew..... Skermo.....	10,733.1 8,538.7 6,988.3 2,976.0	4.030726 3.931394 3.844374 3.473631
Harding.....	48 57 53.30 103 46 15.50	66 41 57 180 14 36 215 50 35 274 30 08	246 40 55 0 14 37 35 52 16 94 33 38	Skermo..... Fled..... Bowie..... Brown.....	1,832.3 4,102.9 4,671.8 5,690.8	3.262995 3.613094 3.669481 3.755174
Mon. 590.....	48 59 58.31 103 48 47.11	6 57 16 90 07 56 91 44 15 321 23 04 343 00 36	186 56 46 270 06 14 271 42 28 141 24 58 163 01 28	Cairn south of Skermo..... Mon. 589..... Flew..... Harding..... Skermo.....	6,634.4 2,748.1 2,880.5 4,941.3 4,795.9	3.821800 3.439035 3.459464 3.693841 3.680869
Mon. 591.....	48 59 58.11 103 46 20.01	90 08 56 90 56 13 203 48 12 271 23 06	270 05 23 270 52 35 23 48 16 91 24 51	Mon. 589..... Flew..... Fled..... Bowie.....	5,738.1 5,869.8 270.4 2,828.2	3.758765 3.768626 2.432087 3.451508
Mon. 592.....	48 59 57.91 103 44 04.12	34 46 23 43 36 22 90 08 21 95 28 16 314 03 56	214 44 44 223 33 40 270 06 38 275 26 38 134 03 58	Harding..... Skermo..... Mon. 591..... Fled..... Bowie.....	4,685.5 6,315.1 2,762.2 2,665.0 90.66	3.670760 3.800380 3.441253 3.425705 1.957430
Mon. 593.....	48 59 57.80 103 42 42.91	48 21 46 87 51 26 90 07 48 241 00 52 342 34 06	228 19 05 267 50 27 270 06 47 61 01 27 162 34 56	Harding..... Bowie..... Mon. 592..... Olsen..... Brown.....	5,785.9 1,586.7 1,650.8 1,089.0 4,502.1	3.762373 3.200507 3.217686 3.037034 3.653418
Mon. 594.....	48 59 57.65 103 41 01.96	9 19 47 90 08 32 115 50 44 269 56 41 306 11 36	189 19 21 270 07 16 295 50 03 89 58 42 128 13 30	Brown..... Mon. 593..... Olsen..... Gopher..... Ruin.....	4,348.3 2,052.0 1,221.4 3,255.3 3,914.1	3.638319 3.312187 3.086862 3.512590 3.592630
Mon. 595.....	48 59 57.49 103 39 18.52	33 14 41 90 08 19 99 32 19 269 39 08 338 04 15	213 12 57 270 07 01 279 30 20 89 39 51 158 04 51	Brown..... Mon. 594..... Olsen..... Gopher..... Ruin.....	5,124.0 2,102.5 3,246.5 1,152.8 2,604.7	3.709612 3.322744 3.511409 3.061744 3.415754
Mon. 596.....	48 59 57.36 103 37 39.40	23 22 47 90 07 56 90 44 46 293 07 20	203 22 08 270 06 41 270 44 14 113 10 13	Ruin..... Mon. 595..... Gopher..... Ledge.....	2,627.7 2,014.6 861.9 5,080.9	3.419571 3.304187 2.935459 3.705944
Mon. 597 ecc.....	48 59 57.20 103 35 53.36	53 03 04 90 08 27 90 19 12 248 06 07 308 21 37	233 01 06 270 07 07 270 17 20 68 07 39 128 23 11	Ruin..... Mon. 596..... Gopher..... Hagen..... Ledge.....	4,003.0 2,155.5 3,017.3 2,662.4 3,209.4	3.602389 3.333541 3.479622 3.425277 3.506422
Mon. 597.....	48 59 57.20 103 35 55.73	90 08 25 90 19 21 270 08 25	270 07 07 270 17 30 90 08 27	Mon. 596..... Gopher..... Mon. 597 ecc.....	2,107.3 2,999.2 48.17	3.323725 3.472634 1.682804
Mon. 598.....	48 59 57.26 103 34 00.43	90 03 46 90 10 52 190 01 42 259 09 36 353 41 59	270 01 01 270 07 35 10 01 48 79 12 12 173 42 07	Mon. 596..... Gopher..... Hagen..... Custom..... Ledge.....	4,451.0 5,312.9 1,006.0 4,287.4 2,006.2	3.648461 3.725329 3.002802 3.632189 3.302380
Mon. 599.....	48 59 57.29 103 32 25.74	40 31 23 89 58 31 119 30 05 250 37 31 307 57 06	220 30 20 269 57 19 299 29 00 70 38 56 127 58 52	Ledge..... Mon. 598..... Hagen..... Custom..... Ambrose.....	2,624.5 1,924.8 2,099.9 2,423.6 3,609.9	3.419050 3.284380 3.303164 3.384463 3.557491



## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 600.....	48 59 57.33 103 30 55.53	60 35 21 209 26 55 296 00 43 335 30 30	240 33 10 29 27 11 116 02 02 155 31 08	Ledge..... Custom..... School=Ambrose N. E. base... Ambrose.....	4,063.2 921.5 2,376.8 2,441.5	3.608968 2.964482 3.375900 3.387663
Mon. 601.....	48 59 57.36 103 29 30.93	17 40 05 89 58 23 122 19 52 239 04 23 338 15 50	197 39 39 269 57 19 302 19 05 59 06 09 158 16 05	Ambrose..... Mon. 600..... Custom..... Friess..... School=Ambrose N. E. base	2,333.0 1,719.6 1,498.6 3,335.5 1,123.7	3.367918 3.235415 3.175684 3.523185 3.050660
Mon. 602.....	48 59 57.42 103 27 09.79	27 38 15 66 55 34 89 58 47 179 46 40 245 30 24	207 37 44 246 54 03 269 57 01 350 46 40 65 32 02	Nat..... School=Ambrose N. E. base... Mon. 601..... Friess..... Wheat.....	1,810.5 2,666.5 2,868.8 1,711.8 2,883.0	3.257790 3.425946 3.457703 3.233454 3.450840
Mon. 603.....	48 59 57.48 103 24 54.56	65 54 56 89 58 46 121 50 34 174 01 53 343 32 28	245 52 43 269 57 04 301 48 52 354 01 48 163 32 42	Nat..... Mon. 602..... Friess..... Wheat..... Gubert.....	3,931.7 2,748.8 3,242.7 1,199.5 1,291.9	3.594585 3.439150 3.510902 3.078984 3.111245
Mon. 604.....	48 59 57.52 103 22 49.48	60 20 08 89 58 56 114 05 19 244 11 44 321 36 30	240 18 47 269 57 22 294 03 40 64 13 41 141 36 46	Gubert..... Mon. 603..... Wheat..... Lister..... Bone.....	2,505.4 2,542.5 2,921.0 3,498.4 689.8	3.398873 3.405280 3.465538 3.543867 2.838752
Mon. 605.....	48 59 57.56 103 21 00.28	73 10 31 89 58 43 211 27 46 331 43 26	253 09 24 269 57 21 31 28 21 151 44 12	Bone..... Mon. 604..... Lister..... Huso.....	1,871.5 2,219.6 1,782.9 2,628.4	3.272186 3.346270 3.251125 3.419685
Mon. 606.....	48 59 57.60 103 18 50.80	30 55 56 83 01 16 89 59 10 239 28 47 297 38 50	210 55 04 262 58 32 269 57 32 59 30 25 117 40 35	Huso..... Bone..... Mon. 605..... Hold..... Bloom.....	2,700.0 4,456.5 2,631.9 3,070.0 3,190.6	3.431356 3.648994 3.420282 3.487139 3.503879
Mon. 607.....	48 59 57.64 103 17 00.36	89 58 39 111 03 59 194 25 25 338 36 06	269 57 16 291 01 33 14 25 40 158 36 28	Mon. 606..... Lister..... Hold..... Bloom.....	2,244.8 4,227.3 1,607.8 1,592.3	3.351177 3.62061 3.206234 3.202032
Mon. 608.....	48 59 57.68 103 15 34.79	38 00 05 89 58 45 139 18 13 261 20 15 325 51 48	217 59 22 269 57 40 319 17 23 81 22 28 145 55 32	Bloom..... Mon. 607..... Hold..... Good..... Church.....	1,882.5 1,739.5 2,052.8 3,616.7 2,134.1	3.274728 3.240423 3.312344 3.558306 3.329209
Mon. 609.....	48 59 57.73 103 13 44.53	30 35 23 66 25 22 89 58 07 247 53 38	210 34 44 246 23 16 269 56 44 67 54 27	Church..... Bloom..... Mon. 608..... Good.....	2,055.1 3,710.5 2,241.2 1,440.4	3.312640 3.569432 3.350471 3.158472
Mon. 610.....	48 59 57.77 103 12 09.83	59 13 16 89 58 15 132 29 28 352 20 40	239 11 26 269 57 03 312 29 06 172 20 50	Church..... Mon. 609..... Good..... Mouse.....	3,458.4 1,924.8 800.3 1,985.5	3.538873 3.284389 2.903286 3.297862
Mon. 611.....	48 59 57.66 103 09 50.28	52 39 03 90 05 00 90 02 16 255 55 26 296 26 36	232 37 27 270 03 15 279 00 09 75 57 44 116 28 22	Mouse..... Mon. 610..... Good..... Hansen..... Bacon.....	3,237.0 2,836.7 3,469.7 3,828.7 3,197.4	3.510138 3.452818 3.540289 3.583047 3.504796
Mon. 612.....	48 59 57.57 103 07 49.18	68 44 24 90 04 48 95 20 12 233 19 26 344 15 09	248 41 17 270 03 17 275 16 34 53 20 13 164 15 24	Mouse..... Mon. 611..... Good..... Hansen..... Bacon.....	5,403.2 2,461.4 5,913.3 1,562.0 1,477.1	3.732649 3.391174 3.771833 3.193690 3.169413
Mon. 613.....	48 59 57.56 103 05 38.50	57 47 52 90 01 11 123 37 39 246 20 29 308 16 01	237 46 28 269 59 32 303 36 47 66 22 03 128 17 22	Bacon..... Mon. 612..... Hansen..... Burner..... Feeney.....	2,666.4 2,656.4 1,685.3 2,762.0 2,796.6	3.425926 3.424300 3.226665 3.441225 3.446632
Mon. 614.....	48 59 57.55 103 03 07.62	26 43 30 75 04 50 90 01 21 101 49 08 154 10 24 263 13 00	206 42 58 255 01 33 269 59 27 281 46 22 334 10 04 83 14 54	Feeney..... Bacon..... Mon. 613..... Hansen..... Burner..... Just.....	1,939.2 5,509.6 3,066.8 4,566.3 1,231.1 3,080.4	3.287616 3.741118 3.486689 3.658569 3.090306 3.498610
Mon. 615.....	48 59 57.50 103 00 56.93	63 53 37 90 02 40 109 10 50 227 50 29 325 35 53	243 51 26 270 01 01 289 08 52 47 50 44 145 36 55	Feeney..... Mon. 614..... Burner..... Just..... Plow.....	3,930.4 2,656.5 3,380.0 543.0 2,953.6	3.594438 3.424315 3.528914 2.734780 3.470345
Peterson.....	49 00 06.50 102 56 48.70	51 13 45 91 05 30 276 42 59 324 00 04	231 11 40 271 02 38 96 43 53 154 01 08	Plow..... Just..... Ross..... Corn.....	4,334.1 4,643.7 1,482.4 3,918.1	3.636902 3.668862 3.170970 3.593070

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 616.....	48 59 57.46 102 58 50.52	20 19 01 90 02 24 99 35 18 263 33 24 268 26 56 307 41 24	200 18 27 270 00 44 279 33 54 83 34 56 88 29 23 127 44 00	Plow..... Mon. 615..... Just..... Peterson..... Ross..... Corn.....	2,597.5 2,569.5 2,197.5 2,491.8 3,949.8 5,301.3	3.414562 3.409851 3.341938 3.396508 3.596575 3.724383
Mon. 617.....	48 59 57.40 102 56 47.17	54 29 34 90 03 21 94 31 11 173 42 04 265 43 52	234 27 28 270 01 48 274 28 18 353 42 03 85 44 46	Plow..... Mon. 616..... Just..... Peterson..... Ross.....	4,186.2 2,507.2 4,688.4 2,826.6 1,445.2	3.622128 3.399184 3.671027 2.451269 3.159940
Mon. 618.....	48 59 57.34 102 54 34.31	17 24 33 90 03 04 94 57 36 262 53 59 317 13 46	197 23 55 270 01 23 274 56 49 82 56 31 137 15 49	Corn..... Mon. 617..... Ross..... Estevan..... Crosby 2.....	3,394.5 2,700.5 1,264.0 4,118.2 4,880.6	3.530778 3.431444 3.101730 3.614710 3.688475
Mon. 619.....	48 59 57.32 102 52 58.45	42 29 12 90 01 48 91 58 38 256 37 11 339 09 10	222 27 22 270 00 36 271 56 39 76 38 30 159 10 01	Corn..... Mon. 618..... Ross..... Estevan..... Crosby 2.....	4,390.4 1,948.6 3,209.7 2,197.9 3,833.9	3.642506 3.289726 3.506465 3.342003 3.583640
Short .....	49 00 24.92 102 50 02.00	26 38 09 76 37 48 317 23 18	208 36 46 256 36 54 137 24 32	Crosby 2..... Estevan..... Center I.....	4,961.7 1,488.3 2,927.0	3.695634 3.172604 3.466419
Mon. 620.....	48 59 57.30 102 51 00.64	90 01 50 153 16 15 234 23 21 292 16 45	270 00 21 333 16 05 54 24 05 112 18 43	Mon. 619..... Estevan..... Short..... Center I.....	2,394.7 569.9 1,465.7 3,429.7	3.379259 2.755773 3.169041 3.535259
Mon. 621.....	48 59 57.24 102 49 40.56	90 03 57 105 10 30 152 59 36 310 03 02	270 02 57 265 09 20 332 59 19 130 03 59	Mon. 620..... Estevan..... Short..... Center I.....	1,627.6 1,951.8 959.6 2,019.3	3.211545 3.290437 2.982090 3.305197
Mon. 622.....	48 59 57.10 102 47 55.29	24 40 00 90 08 00 108 28 06 248 33 21	204 39 38 270 06 41 288 26 30 68 36 11	Center I..... Mon. 621..... Short..... Percee.....	1,425.0 2,139.9 2,715.2 4,923.0	3.153806 3.330396 3.433796 3.692234
Mon. 623.....	48 59 57.00 102 46 45.92	57 12 35 90 07 44 90 08 26 240 24 26 310 15 01	237 11 21 270 06 52 270 06 14 60 26 24 130 17 05	Center I..... Mon. 622..... Mon. 621..... Percee..... Columbus.....	2,385.0 1,409.9 3,549.9 3,648.7 4,387.0	3.377485 3.149201 3.550210 3.562140 3.642165
Mon. 633.....	48 59 55.62 102 27 21.98	81 41 51 141 21 58 283 43 29	261 40 24 321 21 26 103 44 24	Center IV..... North Portal..... Center V.....	2,366.4 1,389.9 1,516.7	3.374080 3.142999 3.180894
Mon. 634.....	48 59 55.63 102 24 51.13	77 15 22 90 00 25 244 16 42 349 24 03	257 14 23 269 58 31 64 17 54 169 24 26	Center V..... Mon. 633..... Bien..... Klitzke.....	1,633.2 3,066.2 2,160.0 3,332.8	3.213044 3.486595 3.334462 3.522806
Mon. 635.....	48 59 55.65 102 22 37.51	32 43 12 90 00 19 140 35 29	212 41 54 269 58 38 320 35 00	Klitzke..... Mon. 634..... Bien.....	3,893.8 2,716.2 1,212.4	3.590377 3.433955 3.083648
Mon. 637.....	48 59 55.68 102 18 51.62	63 57 27 90 00 34 99 55 37 223 15 06 322 35 02	243 53 18 269 57 44 279 52 18 43 16 18 142 36 45	Klitzke..... Mon. 635..... Bien..... Spy..... Flax.....	7,450.0 4,591.5 5,441.9 2,805.7 4,562.5	3.872504 3.661954 3.735750 3.448035 3.659200
Mon. 646.....	48 59 55.85 102 02 47.31	47 37 04 146 30 00 226 21 48	227 36 47 326 28 39 46 23 34	Center VI..... Oxbow..... Souris.....	619.1 3,956.5 3,961.1	2.791796 3.597307 3.597819
Mon. 647.....	48 59 55.87 102 00 43.15	17 02 43 89 59 39 187 10 47 247 13 28 296 49 17	197 02 00 269 58 05 7 11 00 67 17 45 116 53 45	Sherwood..... Mon. 646..... Souris..... Glen..... School.....	3,970.5 2,523.9 2,753.5 7,514.6 8,093.6	3.598844 3.402070 3.439891 3.875904 3.908142
Mon. 648.....	48 59 55.89 101 58 49.30	89 59 39 90 00 24 144 12 59 237 48 23 306 40 51	269 58 13 269 57 24 324 11 46 57 51 14 126 43 53	Mon. 647..... Mon. 646..... Souris..... Glen..... School.....	2,314.2 4,838.1 3,367.2 5,454.3 6,118.9	3.364394 3.684670 3.527268 3.736737 3.786672
Mon. 655.....	48 59 56.78 101 47 01.89	37 13 12 129 35 30	217 11 28 309 35 25	Morse west base..... Center VIII.....	4,642.0 164.9	3.666709 2.217277
Mon. 658.....	48 59 57.11 101 41 52.80	45 06 47 90 52 50 127 59 36 326 18 23	225 04 08 270 48 52 307 56 59 146 19 55	Nelson..... Center VIII..... Lyall..... Coutts.....	6,044.2 6,410.5 5,335.1 4,453.0	3.781339 3.806890 3.727145 3.648651
Mon. 659.....	48 59 57.21 101 40 21.36	89 54 51 197 04 38 350 39 10	269 53 42 17 05 16 170 39 32	Mon. 658..... Fife..... Coutts.....	1,858.6 3,452.6 3,758.5	3.269188 3.538150 3.575011

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 662.....	48 59 57.55 101 35 15.73	143 27 11 181 45 10	323 26 27 1 45 15	Center IX..... Winter.....	2,012.7 4,217.6	3.303777 3.625061
Mon. 663 ecc.....	48 59 57.68 101 33 28.97	22 44 59 89 54 17 115 36 08 154 09 51	202 44 18 269 52 56 295 34 03 334 08 35	Simmons..... Mon. 662..... Center IX..... Winter.....	2,833.3 2,170.0 3,734.6 4,679.7	3.452296 3.336464 3.572242 3.670216
Mon. 684.....	48 59 58.38 100 54 42.34	2 35 47 198 14 49	182 35 41 18 15 45	Hope..... Smart.....	3,326.0 4,801.4	3.521923 3.681370
Mon. 685.....	48 59 58.32 100 52 58.66	90 03 44 172 28 42 306 44 53	270 02 26 352 28 20 126 45 12	Mon. 684..... Smart..... Center XV.....	2,107.4 4,601.3 6,515.9	3.323750 3.662890 3.813973
Mon. 686.....	48 59 58.25 100 51 13.50	76 30 43 90 04 04 212 19 28 338 10 50	256 29 43 270 02 44 32 20 46 158 11 42	Center XV..... Mon. 685..... Smith..... Sween.....	1,661.4 2,157.6 3,950.1 3,800.1	3.220480 3.329917 3.596607 3.579792
Mon. 691.....	48 59 57.98 100 41 03.57	279 49 00 317 34 19	99 50 42 137 34 35	Souris east base..... Souris west base.....	2,796.9 638.8	3.446675 2.805370
Mon. 692.....	48 59 57.91 100 38 32.32	33 51 04 79 56 47 90 03 23	213 50 52 259 55 09 270 01 29	Souris east base..... Souris west base..... Mon. 691.....	572.4 2,685.0 3,074.5	2.757674 3.428946 3.487775
Mon. 693.....	48 59 57.87 100 36 45.82	79 12 19 84 27 52 90 02 37	259 10 46 264 24 53 270 01 17	Souris east base..... Souris west base..... Mon. 692.....	2,528.5 4,831.2 2,164.7	3.402862 3.684058 3.335405
Mon. 697.....	48 59 57.73 100 30 45.08	127 21 45	307 21 45	Bottineau.....	2.1	0.321184
Mon. 699.....	48 59 57.65 100 25 46.44	161 25 36	341 25 36	Summit.....	3.8	0.577492
Hub 41.....	48 59 57.40 100 13 34.13	4 45 36 190 17 37	184 45 24 10 17 58	Ack..... Fair.....	3,876.0 3,129.3	3.588388 3.495453
Mon. 708.....	48 59 57.43 100 10 27.84	90 00 35 133 40 23	269 58 14 313 38 23	Hub 41..... Fair.....	3,786.6 4,459.2	3.578244 3.649252
Center XVIII.....	48 59 35.00 100 10 07.89	54 56 53 99 23 44 136 05 44 149 39 01 273 50 05	234 54 06 279 21 08 316 03 29 329 38 46 93 56 09	Ack..... Hub 41..... Fair..... Mon. 708..... Worth.....	5,517.4 4,249.2 5,235.6 802.8 9,843.0	3.741736 3.628308 3.718966 2.904592 3.993128
Mon. 711.....	48 59 57.34 100 04 02.09	84 44 12 90 03 37 299 38 29	264 39 36 269 58 46 119 39 57	Center XVIII..... Mon. 708..... Worth.....	7,467.7 7,841.0 2,742.7	3.873189 3.894370 3.438178
Mon. 712.....	48 59 57.30 100 01 38.55	21 31 08 90 02 11	201 30 49 270 00 23	Worth..... Mon. 711.....	1,457.4 2,917.7	3.163590 3.465037
Ninga H.....	49 01 51.30 99 59 57.90	27 53 20 286 18 36 288 42 34 318 03 19	207 51 44 106 25 18 108 50 53 138 04 49	Worth..... Center XX..... St. Johns..... Center XIX.....	5,517.9 11,262.0 14,177.2 3,607.7	3.741771 4.051614 4.151589 3.557230
Mon. 713.....	48 59 57.25 99 59 47.28	64 10 30 90 03 06 249 04 04	244 08 46 270 01 42 69 05 26	Worth..... Mon. 712..... Center XIX.....	3,107.2 2,261.7 2,350.8	3.492373 3.354444 3.371214
Mon. 714.....	48 59 57.24 99 58 37.53	90 01 24 155 08 34 222 48 46	270 00 31 335 07 33 42 49 15	Mon. 713..... Ninga H..... Center XIX.....	1,417.8 3,883.7 1,144.9	3.151613 3.589250 3.058764
Mon. 715.....	48 59 57.19 99 55 52.95	79 53 51 90 02 38 108 09 38 125 20 02 266 30 55	259 49 10 270 00 34 288 08 03 305 16 57 86 34 32	Worth..... Mon. 714..... Center XIX..... Ninga H..... Center XX.....	7,680.3 3,345.4 2,701.4 6,099.3 5,840.9	3.885378 3.524444 3.431584 3.785282 3.766479
Mon. 716.....	48 59 57.16 99 54 17.01	90 02 08 117 00 50 264 47 03 279 02 28	270 00 56 296 56 33 84 49 27 99 06 29	Mon. 715..... Ninga H..... Center XX..... St. Johns.....	1,950.1 7,772.7 3,896.2 6,579.4	3.290062 3.890574 3.590644 3.818184
Mon. 717.....	48 59 57.12 99 52 22.56	90 02 30 90 02 59 110 54 59 257 09 31 283 56 06	270 01 03 270 00 20 290 49 15 77 10 29 103 58 41	Mon. 716..... Mon. 715..... Ninga H..... Center XX..... St. Johns.....	2,326.2 4,276.3 9,901.9 1,593.9 4,297.5	3.366647 3.631069 3.995719 3.202466 3.633213
Mon. 718.....	48 59 57.08 99 50 41.11	90 02 53 124 58 24	270 01 37 304 58 05	Mon. 717..... Center XX.....	2,062.3 620.0	3.314344 2.792426
Mon. 719.....	48 59 57.05 99 49 04.72	90 01 57 98 13 36 104 57 36 254 54 06 351 48 56	270 00 44 278 12 04 284 49 23 74 56 37 171 49 02	Mon. 718..... Center XX..... Ninga H..... Bannerman south base..... St. Johns.....	1,959.2 2,492.8 13,733.8 4,208.3 1,045.0	3.292982 3.396691 4.137790 3.624104 3.019124

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 720.....	48 59 56.99 99 46 43.14	69 17 29 90 03 02 227 14 11	249 15 48 270 01 15 47 14 55	St. Johns..... Mon. 719..... Bannerman south base.....	2,918.2 2,877.9 1,615.1	3.465111 3.459070 3.208189
Mon. 721.....	48 59 57.06 99 45 23.50	76 38 13 89 55 55 158 25 33	256 35 32 269 54 55 338 25 17	St. Johns..... Mon. 720..... Bannerman south base.....	4,469.7 1,618.7 1,176.8	3.650276 3.209175 3.070688
Mon. 722.....	48 59 57.13 99 44 06.64	80 04 51 89 55 47 118 42 35	260 01 11 269 54 49 298 41 21	St. Johns..... Mon. 721..... Bannerman south base.....	6,001.0 1,562.3 2,274.3	3.778223 3.193774 3.356852
Mon. 728.....	48 59 57.79 99 32 25.05	46 31 23 137 53 22	226 29 54 317 53 22	Prise..... Center XXIII.....	3,322.8 2.9	3.521506 0.463109
Mon. 729.....	48 59 57.90 99 30 33.12	89 58 52 305 18 46	269 57 27 125 20 27	Center XXIII..... Field.....	2,277.0 3,336.2	3.357362 3.523257
Mon. 730.....	48 59 57.99 99 28 51.62	89 55 38 341 10 33	269 54 21 161 10 57	Mon. 729..... Field.....	2,063.0 2,041.3	3.314504 3.309907
Mon. 731.....	48 59 58.09 99 27 09.96	36 03 04 89 55 44 287 48 50	216 02 12 269 54 27 107 53 45	Field..... Mon. 730..... Hans.....	2,393.3 2,066.4 8,362.2	3.378988 3.315212 3.922322
Hub 2.....	48 59 58.30 99 23 26.92	71 56 10 89 56 22 306 52 27	251 52 29 269 53 33 126 54 34	Field..... Mon. 731..... Hans.....	6,251.9 4,533.7 4,282.1	3.796012 3.656455 3.631658
Mon. 733.....	48 59 58.29 99 23 38.48	269 55 40	89 55 49	Hub 2.....	234.9	2.370859
Mon. 740.....	48 59 58.96 99 13 29.64	116 31 57 207 37 21 304 16 48	296 27 03 27 38 36 124 18 51	Wright..... Clear..... Ridge.....	8,830.8 4,382.8 4,003.0	3.946002 3.641752 3.602381
Mon. 742.....	48 59 59.11 99 10 40.53	3 19 13 78 00 40 89 56 41 109 11 41 160 06 55 237 10 29	183 19 08 257 53 09 269 54 33 289 04 40 340 06 03 57 13 37	Ridge..... Hans..... Mon. 740..... Wright..... Clear..... Wills.....	2,263.8 12,430.6 3,437.3 12,003.0 4,124.6 6,004.1	3.354836 4.094493 3.536223 4.079289 3.615381 3.778448
Mon. 745.....	48 59 59.47 99 05 41.21	69 57 43 162 17 18 332 48 30	249 53 52 342 16 39 152 49 31	Ridge..... Wills..... Mott.....	6,618.4 3,402.5 3,578.3	3.820750 3.531803 3.553680
Mon. 752.....	48 59 59.91 98 58 47.15	64 48 15 186 21 19 235 25 21 298 47 38	244 44 03 6 21 34 55 29 08 118 51 38	Mott..... Crystal..... City..... Badger.....	7,499.4 3,550.5 7,415.1 7,380.1	3.875026 3.550285 3.870118 3.868063
Mon. 753.....	49 00 00.04 98 57 27.78	89 52 03 226 54 47 306 15 49	269 51 03 46 57 34 126 18 49	Mon. 752..... City..... Badger.....	1,613.4 6,152.3 6,019.1	3.207732 3.789041 3.779533
Hub 5.....	49 00 00.27 98 50 58.09	234 04 24 269 55 01	54 10 03 90 00 54	Star Mound..... Hannah.....	11,277.5 9,506.2	4.052213 3.978007
Mon. 758.....	49 00 00.27 98 50 50.85	89 57 44	269 57 38	Hub 5.....	147.2	2.167784
Mon. 761.....	49 00 00.35 98 46 52.58	89 59 48 212 06 48 269 56 14	269 56 43 32 09 22 89 59 02	Hub 5..... Star Mound..... Hannah.....	4,990.4 7,802.4 4,515.8	3.698137 3.892226 3.654735
Mon. 764.....	49 00 00.45 98 42 54.35	90 00 41	270 00 29	Hannah.....	326.5	2.513870
Mon. 765.....	49 00 00.47 98 41 40.05	89 59 25 181 42 16	269 58 17 1 42 18	Hannah..... Hannah south base.....	1,836.7 1,151.3	3.264044 3.061189
Hub 9.....	49 00 00.55 98 40 17.47	89 55 26 89 58 04 124 56 30 157 05 51	269 54 24 269 55 53 304 55 29 337 04 49	Mon. 765..... Hannah..... Hannah south base..... Hannah north base.....	1,678.5 3,515.2 2,005.4 4,261.6	3.224909 3.545947 3.302191 3.629570
Mon. 766.....	49 00 00.50 98 40 13.08	91 05 41	271 05 38	Hub 9.....	89.3	1.950808
Hub 10.....	49 00 00.51 98 39 07.64	89 59 17 90 00 15 90 03 31 110 35 08 141 55 27	269 58 27 269 57 12 270 02 39 290 33 15 321 53 33	Mon. 766..... Hannah..... Hub 9..... Hannah south base..... Hannah north base.....	1,330.1 4,934.6 1,419.4 3,271.9 4,989.2	3.123896 3.693252 3.152113 3.514802 3.698034
Mon. 767.....	49 00 00.51 98 38 55.93	90 00 47	270 00 38	Hub 10.....	237.9	2.376477
Hub 12.....	49 00 00.66 98 35 06.64	90 00 46 98 13 28 116 13 44 122 58 22	269 54 41 278 08 32 296 08 48 302 52 03	Hannah..... Hannah south base..... Hannah north base..... Star Mound.....	9,833.1 8,043.2 8,887.0 12,139.4	3.992690 3.905428 3.948753 4.084198
Mon. 770.....	49 00 00.61 98 34 58.00	90 31 20	270 31 13	Hub 12.....	175.7	2.244735

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 788.....	49 00 00.91 98 11 11.04	273 05 24	93 05 38	South Pembina.....	389.3	2.590288
Mon. 798.....	49 00 01.60 97 57 58.42	91 39 20 100 21 57 120 38 39 210 03 54	271 32 32 280 16 15 300 32 56 30 04 07	Birch..... South Outlook..... North Outlook..... Haskett south base station.....	10,994.8 9,345.3 10,703.2 714.6	4.041186 3.970592 4.029514 2.854045
Mon. 800.....	49 00 01.69 97 55 19.72	89 58 01 97 43 39 102 07 54 113 42 29 224 21 26 243 10 45	269 56 01 277 35 58 282 06 07 293 34 47 44 21 56 63 13 23	Mon. 798..... South Outlook..... Haskett south base station..... North Outlook..... Kloss..... Center XXVIII.....	3,225.7 12,531.3 2,932.9 13,576.9 1,168.6 4,761.4	3.508627 4.097996 3.467293 4.132800 3.067655 3.677734
Mon. 803.....	49 00 01.79 97 51 21.87	164 46 40 235 24 05	344 46 18 55 24 50	Center XXVIII..... Berg.....	2,221.7 1,476.8	3.346676 3.169324
Mon. 804.....	49 00 01.82 97 50 01.94	89 58 36 134 09 18 174 05 21 219 00 31	269 57 36 314 07 56 354 05 02 39 02 57	Mon. 803..... Center XXVIII..... Rhine..... Plum.....	1,624.7 3,076.7 4,950.3 6,208.8	3.210768 3.488080 3.694630 3.793010
Mon. 805.....	49 00 01.86 97 48 50.23	89 57 14 173 29 49 206 56 57	269 56 20 353 29 37 26 58 28	Mon. 804..... Center XXIX..... Plum.....	1,457.6 2,772.6 5,409.8	3.163637 3.442888 3.733185
Mon. 806.....	49 00 01.89 97 47 23.27	89 59 03 142 55 59 188 05 46 227 06 30 259 02 57	269 57 58 322 54 42 8 06 11 47 08 14 79 03 37	Mon. 805..... Center XXIX..... Plum..... Center XXX..... Wall.....	1,767.5 3,451.9 4,869.6 3,817.6 1,086.3	3.247352 3.538057 3.687497 3.581785 3.035948
Mon. 807.....	49 00 01.93 97 46 04.04	89 57 56 169 09 27 204 34 23	269 56 56 349 08 52 24 35 07	Mon. 806..... Plum..... Center XXX.....	1,610.4 4,907.6 2,855.1	3.206940 3.690865 3.455618
Mon. 808.....	49 00 01.96 97 44 40.23	89 58 29 95 11 59 168 46 06	269 57 26 275 10 35 348 45 47	Mon. 807..... Wall..... Center XXX.....	1,703.5 2,256.5 2,646.1	3.231337 3.353435 3.422600
Mon. 809.....	49 00 01.99 97 43 25.36	89 58 33 93 06 19 141 52 27 188 12 17 298 31 57	269 57 37 273 03 59 321 51 11 8 12 37 118 32 40	Mon. 808..... Wall..... Center XXX..... Glen..... Cross.....	1,521.9 3,774.6 3,298.6 3,835.9 1,321.1	3.182373 3.576866 3.518333 3.583864 3.120919
Mon. 810.....	49 00 02.04 97 42 06.09	35 28 44 89 57 21 125 25 30 164 21 22 235 38 29	215 28 27 269 56 21 305 23 14 344 20 42 55 40 18	Cross..... Mon. 809..... Center XXX..... Glen..... Center XXXI.....	776.8 1,611.3 4,475.6 3,941.2 3,571.5	2.890321 3.207174 3.650854 3.595630 3.552849
Mon. 811.....	49 00 02.04 97 40 47.43	72 51 26 90 00 23 116 19 40 213 49 26	252 50 10 269 59 23 296 16 25 33 50 16	Cross..... Mon. 810..... Center XXX..... Center XXXI.....	2,145.1 1,598.8 5,852.1 2,425.5	3.331454 3.203789 3.767315 3.384708
Mon. 812.....	49 00 02.01 97 39 27.96	80 14 17 90 02 17 110 44 38	260 12 01 270 01 17 290 40 23	Cross..... Mon. 811..... Center XXX.....	3,719.2 1,615.3 7,335.2	3.570450 3.208262 3.865412
Mon. 813.....	49 00 02.01 97 38 08.53	90 00 30 105 16 51 176 41 30	269 59 30 285 16 44 356 41 21	Mon. 812..... Buy..... Lowe.....	1,614.6 187.9 3,992.8	3.208057 2.273900 3.601276
Mon. 814.....	49 00 01.97 97 36 49.12	90 03 16 91 37 50 155 11 31 269 41 06	270 02 16 271 36 43 335 10 22 89 43 06	Mon. 813..... Buy..... Lowe..... Neché.....	1,614.0 1,796.0 4,393.1 3,236.8	3.207903 3.254296 3.642775 3.510117
Mon. 816.....	49 00 01.93 97 34 10.46	213 43 24 259 50 54	33 43 25 89 51 41	Neché..... Neché west base.....	21.5 1,267.6	1.333128 3.102990
Mon. 817.....	49 00 01.92 97 32 51.06	90 37 04 269 56 32	270 36 51 89 57 52	Neché west base..... Neché east base.....	346.4 2,142.6	2.539582 3.330940
Mon. 818.....	49 00 01.89 97 31 31.78	269 43 47	89 44 07	Neché east base.....	531.2	2.725217
Mon. 823.....	49 00 01.81 97 24 55.42	10 21 05 174 55 55	190 20 53 354 55 44	Den..... More.....	1,865.5 3,293.2	3.270802 3.517621
Mon. 824.....	49 00 01.79 97 23 36.05	46 44 23 90 02 09 149 53 13 202 24 20 236 11 10	226 43 11 270 01 09 329 52 02 22 24 40 56 14 13	Den..... Mon. 823..... More..... Center XXXV..... Let.....	2,676.2 1,613.2 3,793.4 1,383.9 5,943.6	3.427524 3.207695 3.579031 3.141116 3.774053
Mon. 830.....	49 00 01.71 97 15 40.61	199 44 58 345 16 46	19 45 42 165 17 11	Wet..... Nash.....	3,489.6 2,660.1	3.542780 3.424904
Mon. 832.....	49 00 01.70 97 14 15.65	22 14 11 90 01 17 170 33 05 251 37 45	202 13 32 270 00 13 350 32 45 71 38 50	Nash..... Mon. 830..... Wet..... Emerson.....	2,779.1 1,726.8 3,329.8 1,845.4	3.443898 3.237249 3.522421 3.266083

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 833.....	49 00 01.65 97 13 02.05	60 04 03 203 40 29 320 51 34	270 03 05 23 40 38 140 52 51	Mon. 832..... Emerson..... Barnet.....	1,495.9 636.4 3,285.4	3.174910 2.803750 3.516586
Emerson meridian mark.....	48 59 07.75 97 12 34.62	161 29 13 172 20 59 300 13 32	341 28 52 352 20 48 120 14 28	Mon. 833..... Emerson..... Barnet.....	1,756.0 2,268.2 1,754.5	3.244523 3.355672 3.244159
Emerson railroad tower.....	49 00 02.83 97 12 10.55	16 02 47 88 00 40 124 38 02 338 20 27	196 02 29 268 00 01 304 37 32 158 21 05	Emerson meridian mark..... Mon. 833..... Emerson..... Barnet.....	1,770.5 1,047.4 961.5 2,781.3	3.248096 3.020131 2.982903 3.444242
Emerson astronomic station.....	49 00 05.73 97 12 34.64	77 15 21 146 34 26 290 21 54 330 26 45 359 59 11	257 15 00 326 34 15 100 22 12 150 27 41 179 59 11	Mon. 833..... Emerson..... Emerson railroad tower..... Barnet..... Emerson meridian mark.....	571.2 547.4 497.8 3,074.4 1,791.1	2.756796 2.738282 2.697049 3.487756 3.253127
Emerson astronomic station ecc.....	49 00 05.66 97 12 32.65	84 12 52 142 56 04 281 46 40 331 08 36	264 12 51 322 55 51 101 46 57 151 09 31	Emerson astronomic station..... Emerson..... Emerson railroad tower..... Barnet.....	40.66 567.4 458.9 3,058.2	1.609167 2.753873 2.661697 3.485467
Sub.....	49 00 28.95 97 10 45.36	11 45 30 84 07 07 191 48 22 282 38 41	191 45 04 264 05 34 11 48 41 102 41 01	Barnet..... Emerson..... Elkins..... States.....	3,464.5 2,536.0 2,488.3 3,874.9	3.539639 3.404157 3.395897 3.588250
Emerson Presbyterian church spire.....	49 00 29.48 97 12 29.41	5 09 51 55 50 08 270 26 02 335 02 06 337 31 27	185 09 48 235 49 53 90 27 21 155 02 20 157 32 20	Emerson astronomic station ecc..... Emerson..... Sub..... Emerson railroad tower..... Barnet.....	732.6 493.0 2,114.8 908.1 3,688.2	2.864842 2.692830 3.325260 2.958135 3.566818
Mon. 835.....	49 00 01.55 97 10 24.89	23 47 33 91 03 49 153 49 25 270 02 15	203 46 51 271 02 29 333 49 10 90 04 20	Barnet..... Emerson railroad tower..... Sub..... States.....	2,781.8 2,148.2 943.0 3,364.8	3.444332 3.332066 2.974527 3.526964
Mon. 834 ecc.....	49 00 01.61 97 11 37.28	93 11 23 231 19 45 270 03 47 352 10 39	273 10 58 51 20 24 90 04 41 172 10 52	Emerson railroad tower..... Sub..... Mon. 835..... Barnet.....	677.3 1,351.7 1,471.5 2,571.3	2.830781 3.130872 3.167775 3.410146
Mon. 834.....	49 00 01.61 97 11 42.76	93 48 38 270 01 14	273 48 17 90 01 18	Emerson railroad tower..... Mon. 834 ecc.....	566.3 111.22	2.753034 2.046183
Red barn.....	48 59 25.26 97 09 34.82	110 08 52 137 46 18 143 55 30 244 31 36	290 06 55 317 45 40 323 54 37 64 33 03	Emerson railroad tower..... Mon. 835..... Sub..... States.....	3,371.6 1,514.0 2,434.2 2,600.1	3.527842 3.180127 3.389364 3.414983
Mon. 836 ecc.....	49 00 01.05 97 09 04.32	29 17 22 90 32 43 269 35 20	209 16 59 270 31 43 89 36 24	Red barn..... Mon. 835..... States.....	1,267.7 1,637.7 1,727.3	3.103004 3.214224 3.237306
Mon. 836.....	49 00 01.51 97 09 04.06	20 36 45	200 36 45	Mon. 836 ecc.....	14.95	1.174641
Mon. 837.....	49 00 01.46 97 07 44.74	270 11 38	90 11 42	States.....	109.68	2.040127
Mon. 838.....	49 00 01.44 97 06 25.37	90 01 11 207 22 18 325 13 26	270 00 15 27 23 21 145 14 29	States..... Shultz..... Finney.....	1,503.5 3,716.6 2,970.4	3.177111 3.570146 3.472808
Mon. 839.....	49 00 01.35 97 05 06.02	90 04 17 90 06 15 287 57 07 358 06 21	270 02 21 270 05 15 108 02 33 178 06 24	States..... Mon. 838..... Joe..... Finney.....	3,116.4 1,612.9 9,232.0 2,438.7	3.493656 3.207606 3.965297 3.387159
Mon. 840.....	49 00 01.29 97 03 46.72	32 10 23 50 04 18 90 04 57 155 23 05	212 09 26 270 03 18 270 02 01 335 22 09	Finney..... Mon. 839..... States..... Shultz.....	2,877.2 1,611.9 4,728.4 3,635.3	3.458909 3.207350 3.674711 3.560536
Mon. 841.....	49 00 01.25 97 02 27.39	52 16 17 90 03 26 90 05 18 136 36 56 297 07 30	232 14 20 270 02 27 270 01 23 316 35 00 117 10 56	Finney..... Mon. 840..... States..... Shultz..... Joe.....	3,976.5 1,612.3 6,340.7 4,550.3 6,243.3	3.599503 3.207456 3.802138 3.659039 3.796413
Mon. 842.....	49 00 01.20 97 01 08.00	62 56 46 90 03 31 124 55 57 305 49 57	242 53 49 270 02 31 304 53 01 125 52 23	Finney..... Mon. 841..... Shultz..... Joe.....	5,344.3 1,613.8 5,779.7 4,962.3	3.727894 3.207838 3.761906 3.696843
Mon. 843.....	49 00 01.23 96 59 48.64	69 07 49 89 58 55 90 05 25 117 31 56 320 44 11	249 03 52 269 57 55 269 59 30 267 28 00 140 45 37	Finney..... Mon. 842..... States..... Shultz..... Joe.....	6,820.8 1,613.1 9,567.5 7,161.5 3,678.6	3.833637 3.207653 3.980799 3.855004 3.565683

## SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	° ' "	° ' "	° ' "			
Mon. 844.....	49 00 01.12 96 58 29.28	90 03 50 90 07 44 345 54 29	270 01 50 270 06 44 165 54 55	Mon. 842..... Mon. 843..... Joe.....	3,226.2 1,613.1 2,933.5	3.508685 3.207657 3.467379
Mon. 848.....	49 00 00.97 96 53 11.94	90 03 38	270 03 37	Canada.....	25.32	1.403464
Erca.....	49 00 00.74 96 47 08.18	90 05 36 141 21 32 295 33 49	270 01 00 321 19 57 115 38 09	Canada..... Shock..... Wood.....	7,419.0 4,086.2 7,756.4	3.870344 3.612589 3.889659
Mon. 853.....	49 00 00.74 96 46 35.38	90 00 08	269 59 43	Erca.....	666.72	2.823944
Mon. 864.....	49 00 00.57 96 32 02.37	270 04 03	90 04 22	Roseau.....	515.01	2.711816
Mon. 877.....	49 00 00.12 96 14 45.17	90 04 46 176 58 30	269 58 47 356 58 27	Mon. 871..... Suran.....	9,672.6 1,649.4	3.985542 3.217337
Mon. 912.....	48 59 55.96 95 17 06.10	90 10 08 268 43 24 313 06 02	270 06 03 88 45 47 133 12 56	Warroad north base= Mon. 909..... Buffalo..... Willow, 1913.....	6,591.5 3,858.0 15,302.6	3.818986 3.583366 4.184765
Mon. 925.....	49 22 39.26 95 09 11.32	359 58 53	179 58 53	Mon. 913.....	21,902.5	4.340494
Turning Point 1, Northwest Angle Inlet, Lake of the Woods. <sup>1</sup>	49 23 04.14 95 09 11.34	359 58 53	179 58 53	Mon. 925.....	768.8	2.88581
Ref. Mon. 1.....	49 23 04.15 95 08 48.28	31 09 24 89 58 48	211 09 06 269 58 31	Mon. 925..... T. P. 1, Northwest Angle Inlet.	898.6 465.1	2.95355 2.66753
Ref. Mon. 2.....	49 23 04.13 95 09 30.50	269 58 16 269 58 16 333 16 42	89 58 48 89 58 31 153 16 57	Ref. Mon. 1..... T. P. 1, Northwest Angle Inlet. Mon. 925.....	851.7 386.6 860.5	2.93029 2.58729 2.93475

<sup>1</sup> This is the point adopted in lieu of the original Northwesternmost Point of Lake of the Woods in accordance with the provisions of the treaty of 1925.

## DESCRIPTIONS OF TRIANGULATION AND TRAVERSE STATIONS

The stations in the following list are arranged according to the class of triangulation to which they belong and also in the order in which they are listed in the tables of geographic positions. Boundary monuments used as triangulation stations are not described herein, as it is believed they can always be identified by the general description of the types of monuments on page 115 of this report. Other stations omitted from this list are those marked in a temporary manner, used but once, or no longer recoverable.

Within the parentheses in each description immediately following the name of the station is the name of the Province or State, the district or county in which the station is situated, and the name of the Government organization or the member of the boundary survey party that established the station. The person named is generally the chief of party; in some cases, however, he is the member of the party who was responsible for the measurement of the angles. This association of the name of the station with the name of the person who established the station and whose name appears on the field notebooks is intended to facilitate, in later years, any reference to these data in the Government archives. The first date within the parentheses is that of the establishment of the station; the last date is the year in which the station was last occupied or inspected.

All azimuths given in the descriptions are reckoned continuously from true south around by west to  $360^\circ$ , south being  $0^\circ$ , west  $90^\circ$ , north  $180^\circ$ , and east  $270^\circ$ . Where magnetic bearings are given they are indicated as such. All distances are horizontal unless otherwise stated.

The station marks vary so much in character that they have in most cases been described for each station. However, a considerable number of stations established by the Geodetic Survey of Canada were marked in a uniform manner, and the station marks for these have been described as "A standard Geodetic Survey of Canada station mark; see page 333" or "A standard U. S. Coast and Geodetic Survey station mark; see page 333." The reference is to the following note:

For stations established in Canada by the Geodetic Survey of Canada and described in this report, the standard station mark consists of a subsurface mark and a surface mark. The subsurface mark is a bronze disk 3 inches in diameter, stamped "GEODETIC SURVEY OF CANADA TRIANGULATION STATION", set in the center of the top of a rectangular block of concrete 1 foot 6 inches square and 2 feet high. The base of the block is 6 feet underground. The surface mark is a like bronze disk set in the center of the top of a block of concrete 1 foot 6 inches square at the base, 1 foot square at the top, and 5 feet 6 inches high. The base of this upper block of concrete rests upon the top of the subsurface block, separated from it by a sheet of tarred paper. The top of the upper block projects 1 foot 6 inches above the ground. The surface mark is centered vertically over the subsurface mark.

For stations established in the United States by the Geodetic Survey of Canada and described in this report, the standard station mark is the same as just described except that the bronze disks are inscribed "U. S. COAST & GEODETIC SURVEY TRIANGULATION STATION."

Any person who finds that a boundary monument or station described in this list has been disturbed or damaged is requested to send such information to the Commissioner, International Boundary Commission, Washington, D. C., or Ottawa, Ontario.



## GEORGIA STRAIT TO LAKE OF THE WOODS, FIRST-ORDER SCHEME

**Benson** (British Columbia, Vancouver Island District; Geodetic Survey of Canada, 1911).—Near the summit of Mount Benson about 7 miles southwest of Nanaimo, British Columbia, whence a wagon road leads to within a mile of the station and a good trail continues the rest of the way. The station is on the southernmost of the three peaks that form the summit of the mountain and is about 135 meters southeast of the highest peak of the mountain. It is the same point that was used as triangulation station "Benson" in 1909, re-marked in a more permanent manner.

Station mark: A copper bolt  $\frac{3}{4}$  by 4 inches in size set in a drill hole in solid rock. The reference marks are three arrows pointing toward the station; they are cut in the rock and marked with copper bolts at their points. Their directions and distances from the station are as follows: Triangulation station "Shepherd",  $0^{\circ}00'$ ; first reference mark,  $84^{\circ}06'$ , 6.46 meters from the station; second reference mark,  $143^{\circ}28'$ , 10.55 meters from the station; third reference mark,  $279^{\circ}55'$ , 5.00 meters from the station.

**Gardner** (British Columbia, New Westminster District; Geodetic Survey of Canada, 1911).—On the summit of Mount Gardner, the highest point on Bowen Island, which is about 10 miles northwest of Vancouver, British Columbia.

Station mark: A copper bolt  $\frac{3}{4}$  by 4 inches set in the rock with a triangle cut around it. The reference marks are three arrows pointing toward the station; they are cut in the rock with copper bolts set at their points. Their directions and distances from the station are as follows: Point Atkinson Lighthouse,  $0^{\circ}00'$ ; first reference mark,  $84^{\circ}26'$ , 5.30 meters from the station; second reference mark,  $189^{\circ}02'$ , 5.91 meters from the station; third reference mark,  $354^{\circ}57'$ , 6.34 meters from the station.

**Little Mountain** (British Columbia, New Westminster District; Geodetic Survey of Canada, 1920).—On the highest point of Little Mountain, now owned by the City of Vancouver, British Columbia, as a reservoir site. The reservoir enclosure takes in an area of about 10 acres; the reservoir is of considerably less area. The ground surrounding the reservoir is cleared and kept in good order and the whole is protected from the public by a high fence. The station is within the fence quite near the north corner of the property.

Station mark: A copper bolt set in the center of the top of a large concrete pier.

**Delta West Base** (British Columbia, New Westminster District; Geodetic Survey of Canada, 1913; International Boundary Commission, 1934).—About  $3\frac{1}{2}$  miles south of Ladner, British Columbia, and in SE  $\frac{1}{4}$  sec 22, T. 5, New Westminster District. The station is about 460 meters west of the Ladner-Point Roberts road and is a few feet north of the south fence line of a plowed field. A tower is required at the station to see "Delta East Base."

Station mark: A  $\frac{3}{4}$ -inch copper bolt set in a concrete slab 4 feet square and 8 inches thick placed 2 feet 8 inches below the surface of the ground. The reference mark is a concrete monument about 3 feet high set in the west fence line of the Ladner-Point Roberts road 459.11 meters from the station in azimuth  $270^{\circ}32'13''$ .

**Delta East Base** (British Columbia, New Westminster District; Geodetic Survey of Canada, 1913; International Boundary Commission, 1934).—About  $7\frac{1}{2}$  miles east and a little south of Ladner, British Columbia, and in SE  $\frac{1}{4}$  sec. 2, T. 4, New Westminster District. It is a short distance south of the Ladner-Cloverdale road. A tower is required at the station to see "Delta West Base."

Station mark: A  $\frac{3}{4}$ -inch copper bolt set in a slab of concrete 4 feet square and 8 inches thick placed 2 feet 10 inches below the surface of the ground. The reference mark is a concrete monument about 3 feet high set in the fence, 323.42 meters from the station in azimuth  $179^{\circ}05'03''$ .

**Bruce** (British Columbia, Vancouver Island District; Geodetic Survey of Canada, 1911; 1921).—On the south end of Salt Spring Island off the east coast of Vancouver Island. The station is on the summit of Bruce Mountain. It is most easily approached from Fulford Harbor.

Station mark: A copper bolt  $\frac{3}{4}$  by 4 inches set in rock with a triangle cut in the rock around it. The reference marks are two arrows pointing toward the station; they are cut in the rock with copper bolts set at their points. The first reference mark is 6.93 meters from the station in azimuth  $349^{\circ}23'04''$ . The second reference mark is 6.63 meters from the station in azimuth  $144^{\circ}35'52''$ .

**Birch Point** (Washington, Whatcom County; Geodetic Survey of Canada, 1912; U. S. Coast and Geodetic Survey, 1926; International Boundary Commission, 1934).—About 5 miles south of Blaine, Washington, on the high bluff at the western extremity of Birch Point.

Station mark: A copper bolt  $\frac{3}{4}$  by 4 inches set in a small granite boulder 15 inches below the surface of the ground. In 1926 a standard U. S. C. & G. S. bronze-disk station mark was set in concrete over the copper bolt. The reference mark is the old U. S. C. & G. S. station "Birch Point" of 1858. It is marked by a  $\frac{1}{2}$ -inch drill hole 2 inches deep in the top of a boulder about 12 by 15 feet in size which is deeply embedded in the beach gravel and rises about 4 feet above the beach level. The letters and figures "U. S. C. S. 1858" are cut in the rock near the drill hole. The reference mark is at the foot of the bluff, 58.38 meters from the station, in azimuth  $94^{\circ}02'14''$ .

**Douglas** (British Columbia, Vancouver Island District; Geological Survey of Canada, 1909; Geodetic Survey of Canada, 1911; U. S. Coast and Geodetic Survey, 1926).—About 5 miles north of Victoria, British Columbia, on the summit of Mount Douglas, locally known as Cedar Hill.

**Station mark:** The point was found in 1911 marked by a drill hole within a triangle cut in the rock. The drill hole was enlarged and a  $\frac{3}{4}$ -by 4-inch copper bolt was leaded into it. The reference marks are three arrows pointing toward the station; they are cut in the rock and have copper bolts set at their points. The first one is 9.72 meters from the station in azimuth  $175^{\circ}13'$ ; the second is 11.57 meters from the station in azimuth  $277^{\circ}32'$ ; the third is 3.29 meters from the station in azimuth  $354^{\circ}10'$ .

**Constitution** (Washington, San Juan County; Geodetic Survey of Canada, 1911; U. S. Coast and Geodetic Survey, 1926).—On the summit of Mount Constitution on Orcas Island, about 15 miles west of Bellingham, Washington. It may be reached by boat from Bellingham to Olga on East Sound, whence a good wagon road leads to the top of the mountain. This station is near the old U. S. C. & G. S. station "Constitution", but no trace of the old station was found.

**Station mark:** A copper bolt  $\frac{3}{4}$  by 4 inches leaded into a drill hole in the rock with a triangle cut around it. The reference marks are two arrows pointing toward the station, cut in the rock and having copper bolts set at their points. The first reference mark is 7.165 meters from the station in azimuth  $209^{\circ}27'$ ; the second reference mark is 4.250 meters from the station in azimuth  $327^{\circ}47'$ .

**Discovery** (British Columbia, Vancouver Island District; U. S. Coast and Geodetic Survey, 1854; International Boundary Commission, 1910; U. S. Coast and Geodetic Survey, 1926).—On Discovery Island, off the southeastern part of Vancouver Island and on the west side of the south entrance to Haro Strait. The station is on the highest part of the rocky bluff 200 paces west-of-north from the Discovery Island lighthouse.

**Station mark:** The original mark was a drill hole in a depression in the rock. In 1910 a concrete pier was built over the drill hole, 11 inches square and 4 feet high. A copper wire was extended vertically through the pier from the drill hole to the top where it now serves as a center mark for the station. The reference mark is a nail in a manzanita tree bearing north  $27^{\circ}$  west (magnetic) 30.56 meters distant from the station.

**Iceberg** (Washington, San Juan County; U. S. Coast and Geodetic Survey, 1854; 1927).—On Lopez Island about  $\frac{3}{4}$  mile from the southwest end and on the high rocky bluff about 60 meters above high water. About 9 meters east of the station are some deep furrows traced by the action of ice and boulders, the principal one being 15 meters long and 2 or 3 meters deep. Their general direction is north and south. The station is easily found by the proximity of the large concrete reference monument set by the International Boundary Commission in 1909. This monument is a concrete shaft about 5 feet high set on a pedestal 3 feet square and bears the inscription "TREATY OF 1908" on the west side, and "U. S. REFERENCE MARK" on the east side.

**Station mark:** A  $\frac{1}{2}$ -inch drill hole  $2\frac{1}{2}$  inches deep in solid rock. A small drill hole in the top of an International Boundary Commission reference monument is 9 meters from the station in azimuth  $29^{\circ}14'$ . A nail set in a triangular patch of cement is 26.435 meters from the station in azimuth  $285^{\circ}54'$ .

**Parke** (British Columbia, Nanaimo District; Geodetic Survey of Canada, 1911).—On the summit of Mount Parke, locally called Signal Hill, the highest point on Mayne Island, British Columbia. Mayne Island may be reached by steamer from Victoria, landing at Active Pass.

**Station mark:** A copper bolt set in soft rock. One reference mark is a copper bolt 5.58 meters from the station in azimuth  $43^{\circ}39'$ . Two other reference marks are fir trees; the first is 19.72 meters from the station in azimuth  $246^{\circ}31'$ ; the second is 21.49 meters from the station in azimuth  $328^{\circ}39'$ .

**Avenue** (British Columbia, New Westminster District; Geodetic Survey of Canada, 1911; 1931).—On the high bluff on the west shore of Point Roberts and about 25 meters north of the International Boundary. This is not the original U. S. Coast and Geodetic Survey station "Avenue", which was in the same locality.

**Station mark:** A copper bolt  $\frac{3}{4}$  by 4 inches set in a boulder 1 foot below the surface of the ground. The subsurface mark is a like bolt set in a boulder buried 27 inches underground. The station mark is 39.15 meters, in azimuth  $136^{\circ}02'$ , from the center of the large granite monument, Monument 1, of the International Boundary.

**Whatcom** (Washington, Whatcom County; U. S. Geological Survey, 1905; U. S. Coast and Geodetic Survey, 1926).—On the north end of Lookout, or Whatcom, Mountain which lies between Whatcom and Samish Lakes about 6 miles southeast of Bellingham, Washington. The station is on the bare rocky summit. The south end of the mountain or ridge has a summit of about the same elevation about three-fourths mile south of the station, but it is heavily timbered.

**Station mark:** A bronze-disk station mark set in a large sandstone outcrop. Two drill holes in the same rock, close together, are 1.1 meters from the station. The U. S. Coast and Geodetic Survey established a first-order triangulation station about 0.2 meter southeast of the original station mark. The U. S. C. & G. S. station mark is a standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in the same outcropping rock that the original mark is set in. A standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the U. S. C. & G. S. station, is wedged in a drill hole in outcropping bedrock 18.743 meters from the U. S. C. & G. S. station, in azimuth  $251^{\circ}47'$ . A like reference mark, set in the same manner, is 15.266 meters from the station in azimuth  $318^{\circ}39'$ .

**Sumas** (Washington, Whatcom County; U. S. Coast and Geodetic Survey, 1926; International Boundary Commission, 1935).—On the north spur of Nooksack Mountain about 5 miles east of Everson, Washington. The station is not on the highest point of the mountain. It is at the end of a trail from the hillside farm of P. Serverson.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark set in a small boulder buried 1 foot underground. There are two reference marks. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, wedged in a drill hole in outcropping bedrock 57.582 meters from the station; the azimuth is not given. Reference mark No. 2 is a like bronze disk set in the same manner 4.862 meters from the station; the azimuth is not given.

**Sisters** (Washington, Whatcom County; E. C. Barnard, 1905; U. S. Coast and Geodetic Survey, 1926).—On the highest peak of the Twin Sisters Range, the second peak from the north end of the range, and about 17 miles southeast of Deming, Washington. The station is on the southeast end of the peak. It is most readily approached from Deming.

**Station mark:** A bronze-disk station mark set in outcropping bedrock with a 7-foot cairn built over it. In 1926 the U. S. Coast and Geodetic Survey established a first-order triangulation station about 20 inches northwest of the station and marked it as follows: A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in outcropping bedrock marks the station; a standard bronze-disk reference mark, with the arrow pointing toward the station, wedged in a drill hole in outcropping bedrock is 4.72 meters from the station mark in azimuth  $310^{\circ}52'39''$ ; a second and like reference mark is set in the same manner 14.37 meters from the station in azimuth  $100^{\circ}45'29''$ .

**Church** (Washington, Whatcom County; E. C. Barnard, 1905; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1935).—On the highest point on the west end of Church Mountain, a well-known mountain on the north side of the Nooksack River about 5 or 6 miles upstream from the town of Glacier, Washington. There is a good highway up the river and the station is best approached from it.

**Station mark:** The station mark of the original station is not recorded. The station was reestablished in 1925 by the U. S. Coast and Geodetic Survey at a point very close to the original station, but no station mark was recovered. The U. S. C. & G. S. station mark is a standard bronze-disk station mark wedged in a drill hole in outcropping bedrock. A standard bronze-disk reference mark wedged in a drill hole in outcropping bedrock, with the arrow pointing toward the station, is 6.05 meters in azimuth  $238^{\circ}37'$  from the station. A second standard bronze-disk reference mark wedged in a drill hole in outcropping bedrock is 1.88 meters in azimuth  $350^{\circ}30'$  from the station.

**Bacon** (Washington, Whatcom County; E. C. Barnard, 1905; U. S. Coast and Geodetic Survey, 1926).—On the highest of several rocky peaks lying at the heads of the west fork of Bacon Creek and the east fork of Baker River, and a little north of the head of Diaposse Creek—all tributary to the Skagit River. Although the station is but little above the timber line, it is surrounded by heavy glaciers which must be crossed to reach it. Consequently, for safety, it should be occupied in July or August. Heretofore it has been reached from the west fork of Bacon Creek.

**Station mark:** A bronze disk, cemented in outcropping bedrock, with a 7-foot cairn built over it. The station was recovered in 1926 by the U. S. Coast and Geodetic Survey and a first-order triangulation station was established about 10 inches north of the original station mark. The U. S. C. & G. S. station mark is a standard bronze-disk station mark wedged in a drill hole in outcropping bedrock. A standard bronze-disk reference mark wedged in a drill hole in outcropping bedrock, with the arrow pointing toward the U. S. C. & G. S. station mark, is 8.580 meters distant in azimuth  $222^{\circ}30'33''$  from the U. S. C. & G. S. station mark. A second standard bronze-disk reference mark wedged in a drill hole in outcropping bedrock is 7.135 meters distant in azimuth  $8^{\circ}21'58''$  from the U. S. C. & G. S. station.

**Glacier** (Washington, Whatcom County; E. C. Barnard, 1904; U. S. Coast and Geodetic Survey, 1926).—On the highest peak of the Custer Ridge; about 2 miles south of the International Boundary and about 7 miles west of the Skagit River. The peak is pyramidal in shape, is surrounded by glaciers, and is difficult and dangerous to climb. It probably can be best approached from the Boundary ranger station of the United States Forest Service on the Skagit River.

**Station mark:** A standard station-mark disk stamped "U. S. & C. B." set in a drill hole in outcropping bedrock. The U. S. Coast and Geodetic Survey recovered the station in 1926 and reported that the rock in which the disk is set is not solid now. They established and marked a first-order triangulation station 1.44 meters in azimuth  $23^{\circ}18'$  from the original station mark. The U. S. C. & G. S. station mark is a cross in the center of a triangle chiseled in a large rock. A cross surrounded by a circle chiseled in the rock is 13.87 meters in azimuth  $329^{\circ}37'$  from the U. S. C. & G. S. station mark; and a cross surrounded by a circle chiseled in the rock is 5.30 meters in azimuth  $73^{\circ}50'$  from the U. S. C. & G. S. station mark.

**Davis** (Washington, Whatcom County; E. C. Barnard, 1904; U. S. Coast and Geodetic Survey, 1926).—On the highest rocky mountain top 3 miles west of the Davis ranch on the Skagit River and about 22 miles up the river from Marblemount, Washington. It has heretofore been reached by a hard climb on foot from the Davis ranch.

**Station mark:** An aluminum disk marked "U. S. & C. B.", wedged in a drill hole in outcropping bedrock, with a 7-foot cairn built over it. The station was recovered in 1926 by the U. S. Coast and Geodetic Survey and used as a first-order triangulation station. They used the original station mark and set two reference marks: The first, a standard bronze-disk reference mark wedged in a drill hole in outcropping bedrock with the arrow pointing toward the station, is 17.898 meters in azimuth  $183^{\circ}31'$  from the station; the second, a standard bronze-disk reference mark wedged in a drill hole in outcropping bedrock with the arrow pointing toward the station, is 6.511 meters in azimuth  $63^{\circ}30'$  from the station.

**Jackita** (Washington, Whatcom County; U. S. Coast and Geodetic Survey, 1926).—On the highest point of the north-and-south ridge that forms the divide between the head of Devils Creek to the westward and the waters of Canyon Creek to the eastward. Canyon Creek is the north branch of Ruby Creek. These waters are all tributary from the east to the Skagit River. The station is 4 miles by trail from the Chancellor Power Plant.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in a boulder. Reference mark No. 1 is a U. S. C. & G. S. standard bronze-disk reference mark wedged in a drill hole in outcropping bedrock, with the arrow pointing toward the station, in azimuth  $2^{\circ}50'23''$ , 6.282 meters from the station. Reference mark No. 2 is a like mark set in the same manner in azimuth  $134^{\circ}53'07''$ , 2.772 meters from the station.

**Frosty** (British Columbia, Yale District; E. C. Barnard, 1904; U. S. Coast and Geodetic Survey, 1926; International Boundary Commission, 1935).—On the eastern of two high points about 1 mile north of the International Boundary and about  $1\frac{1}{4}$  miles northeast of Monument 77. These two points are on the main watershed of the Cascade Mountains.

**Station mark:** An aluminum disk marked "U. S. & C. B.", set in a drill hole in solid rock, over which is a cairn.

**Robinson** (Washington, Okanogan County; E. C. Barnard, 1904; U. S. Coast and Geodetic Survey, 1925).—On the highest point of Robinson Mountain on the divide between the headwaters of the Pasayten River and the headwaters of the Methow River. The station is about 15 miles by road and trail northwest of Mazama, Washington, and about 4 miles southeast of Robinson Pass.

**Station mark:** An aluminum disk marked "U. S. & C. B." set in solid rock. In 1925 the U. S. Coast and Geodetic Survey set two reference marks as follows: A standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, wedged in a drill hole in a boulder, is 7.212 meters from the station in azimuth  $216^{\circ}07'$ ; and a like mark set in the same manner is 6.282 meters from the station in azimuth  $309^{\circ}52'$ .

**Sheep** (Washington, Okanogan County; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1935).—On the highest point of Sheep, or Park, Mountain, about  $1\frac{1}{4}$  miles south of the International Boundary and about  $2\frac{3}{4}$  miles west of the Ashnola River. Sheep Mountain is a bare peak about 8,300 feet in elevation with heavy cliff faces to the east. It may be approached from U. S. Forest Service trails on the Ashnola River.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in outcropping bedrock. A standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, is wedged in a drill hole in a boulder 15.925 meters from the station in azimuth  $253^{\circ}56'52''$ , and a like mark set in the same manner is 28.870 meters from the station in azimuth  $357^{\circ}04'41''$ .

**Rommel** (Washington, Okanogan County; E. C. Barnard, 1904; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1935).—About 5 miles south of the International Boundary and on the headwaters of the Methow River. The station is on the high, bald, rocky summit of Mount Rommel. It is best reached from Winthrop, Washington, from which point Forest Service roads and trails lead to the lookout house that has been erected by the Forest Service on the summit of the mountain.

**Station mark:** An aluminum disk marked "U. S. & C. B." set in solid rock. In 1925 the U. S. Coast and Geodetic Survey established a first-order triangulation station on the same summit and near the original station. The Coast and Geodetic Survey station mark is a standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in outcropping bedrock. Reference mark No. 1, a standard bronze-disk reference mark with the arrow pointing toward the station, is wedged in a drill hole in a boulder 14.71 meters from the U. S. C. & G. S. station in azimuth  $114^{\circ}08'08''$ . Reference mark No. 2 is a like mark set in the same manner 39.977 meters from the station in azimuth  $242^{\circ}59'28''$ . The original station mark is 0.107 meter from the U. S. C. & G. S. station in azimuth  $205^{\circ}$ . The most northern corner of the lookout is in azimuth  $242^{\circ}33'$  from the original station mark, distant about  $2\frac{3}{4}$  meters. The most western corner is in azimuth  $352^{\circ}10'$  from the station and about  $2\frac{1}{2}$  meters distant. The center of the lookout is in approximate azimuth  $297^{\circ}$ ,  $3\frac{3}{4}$  meters distant from the station.

**Tiffany** (Washington, Okanogan County; U. S. Geological Survey, 1900; E. C. Barnard, 1904; U. S. Coast and Geodetic Survey, 1925).—On the higher and more southern summit of Tiffany Mountain, a round, bare, double-topped mountain in the main range between the Methow and Okanogan Rivers. The station is about 22 miles northeast of Winthrop, Washington, about 20 miles southwest of Loomis, Washington, and about 12 miles northwest of Conconully, Washington. It may be conveniently approached from any of these places.

**Station mark:** A drill hole 6 inches deep in solid rock with an 8-foot cairn built over it. In 1925 the U. S. Coast and Geodetic Survey established a first-order triangulation station 2.890 meters from the original station in azimuth  $88^{\circ}03'$ . The U. S. C. & G. S. station mark is a standard bronze-disk station mark wedged in a drill hole in outcropping bedrock. A standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, is wedged in a drill hole in a boulder 9.321 meters from the U. S. C. & G. S. station in azimuth  $311^{\circ}14'42''$ . A like mark set in the same manner is 8.018 meters from the U. S. C. & G. S. station in azimuth  $24^{\circ}43'34''$ .

**Chopaka** (Washington, Okanogan County; E. C. Barnard, 1904; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1935).—On the highest peak of the big Chopaka Mountain, about  $2\frac{1}{2}$  miles south of the International Boundary, and about  $3\frac{1}{2}$  miles west of the Similkameen River. This peak is about 2 miles northwest of the peak that is locally known as Chopaka Mountain. The station is on the bald and rocky summit. It has heretofore been approached from Loomis, Washington, which is about 15 miles by road and trail to the southeast of the station.

**Station mark:** An aluminum disk marked "U. S. & C. B." set in the solid rock with a cairn built over it. In 1925 the U. S. Coast and Geodetic Survey established a first-order triangulation station on the same peak 3.89 meters, in azimuth  $79^{\circ}34'$ , from the original station mark. Their station mark is a standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in outcropping bedrock. A standard U. S. C. & G. S. bronze-disk reference mark with the arrow pointing toward the station is wedged in a drill hole in outcropping bedrock 8.87 meters from the U. S. C. & G. S. station in azimuth  $2^{\circ}54'30''$ .

**Lemanasky** (Washington, Okanogan County; U. S. Geological Survey, 1900; E. C. Barnard, 1904; U. S. Coast and Geodetic Survey, 1925).—On the highest point on the ridge between the Okanogan River and Simlahekin Creek, about 9 miles northwest of Tonasket, Washington, and about 5 miles south of Loomis, Washington. The peak on which the station is located is locally known as Aeneas Mountain. The mountain is bare except for some timber on the north side.

**Station mark:** A bronze disk cemented in solid rock with a 7-foot cairn built over it. In 1925 the U. S. Coast and Geodetic Survey set a new station mark described as follows: A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in outcropping bedrock, from which the original station mark is in azimuth  $230^{\circ}59'$ , and 9.275 meters distant. A standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, is wedged in a drill hole in outcropping bedrock 19.420 meters from the station mark in azimuth  $206^{\circ}19'18''$ . Another like reference mark set in the same manner is 10.909 meters from the station in azimuth  $285^{\circ}15'43''$ .

**Oroville** (Washington, Okanogan County; U. S. Coast and Geodetic Survey, 1925).—On the summit of a mountain about 6 miles southeast of Oroville, Washington, and about  $1\frac{1}{2}$  miles northwest of the highest point of Mount Hull. This mountain is not quite as high as Mount Hull; it is heavily timbered and lines of sight had to be cleared from the station. There is a small lake known as Black Diamond, or Summit, Lake about one-half mile to the southwest of the station and about 500 feet lower in elevation. The station is a little to the north of and a few feet lower than the summit of the mountain.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in the outcropping bedrock. The two reference marks are U. S. C. & G. S. standard bronze-disk reference marks, with the arrows pointing toward the station, wedged in drill holes in the outcropping bedrock. Reference mark No. 1 is 14.954 meters from the station in azimuth  $342^{\circ}57'$ ; reference mark No. 2 is 5.423 meters from the station in azimuth  $54^{\circ}08'$ .

**Anarchist** (British Columbia, Yale District; U. S. Coast and Geodetic Survey, 1925).—On the southernmost of two peaks of about the same elevation known as Anarchist Mountain, about 4 miles east of the Osoyoos (Canadian) customhouse and east of the north end of Osoyoos Lake. The station is about 150 feet south of the highest point of the mountain.

**Station mark:** A standard Geodetic Survey of Canada station mark set in a solid ledge with cement. The references are similarly marked. Reference mark No. 1 is 7.226 meters from the station in azimuth  $205^{\circ}12'46''$ ; reference mark No. 2 is 11.026 meters from the station in azimuth  $338^{\circ}15'39''$ .

**Osoyoos South Base** (Washington, Okanogan County; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1930).—On the high bench about one mile northwest of Oroville, on the upper Osoyoos road. The station is about 150 meters west of, and about 100 feet higher than the road, and is about 90 meters east of the base of a high rugged bluff. It is on land owned by Mrs. Bartell, and is about midway between a young orchard and the main irrigation ditch.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark set in the top of a square block of concrete. The two reference marks are standard U. S. C. & G. S. bronze-disk reference marks, with the arrows pointing toward the station, wedged in drill holes in boulders. Reference mark No. 1 is 85.737 meters from the station in azimuth  $46^{\circ}19'31''$ . Reference mark No. 2 is 40.939 meters from the station in azimuth  $115^{\circ}54'33''$ .

**Osoyoos North Base** (British Columbia, Yale District; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1930).—On the top of a prominent bare ridge about one-half mile southwest of the old Osoyoos customhouse and about 150 meters north of the Oroville-Osoyoos road where it turns east to cross the neck of the lake.

Station mark: Standard Geodetic Survey of Canada bronze-disk marks were used for the station and reference marks. Reference mark No. 1 is 35.024 meters from the station in azimuth  $79^{\circ}18'38''$ . Reference mark No. 2 is 42.480 meters from the station in azimuth  $201^{\circ}08'27''$ .

**Gillespie** (British Columbia, Yale District; C. H. Sinclair, 1905; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1930).—On the bald summit of a prominent hill 2.2 miles north of the International Boundary and about 1.5 miles west of Bridesville, British Columbia. The hill is sparsely timbered on the north side.

Station mark: The original station mark was replaced in 1925 with a standard Geodetic Survey of Canada bronze-disk station mark set in an outcropping ledge. The reference marks set at the same time are standard marks of the Geodetic Survey of Canada set in drill holes in outcropping rock. Reference mark No. 1 is 15.128 meters from the station in azimuth  $193^{\circ}13'$ . Reference mark No. 2 is 7.048 meters from the station in azimuth  $292^{\circ}01'$ .

**Spur** (Washington, Okanogan County; U. S. Coast and Geodetic Survey, 1925).—On the west end of a timbered ridge about 20 miles southeast of Oroville, Washington, about 5 miles northeast of the summit of Bonaparte Mountain, and about 2 miles northwest of Lost Lake. The station is about 30 meters north of and 6 feet lower than the highest point of the ridge. Lines of sight were cut through the timber to see other stations.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in an outcropping ledge about one foot above the surface of the ground. The two reference marks are standard U. S. C. & G. S. bronze-disk reference marks, with the arrows pointing toward the station, wedged in drill holes in outcropping bedrock. Reference mark No. 1 is on the highest point of the ridge 29.787 meters from the station in azimuth  $4^{\circ}53'$ . Reference mark No. 2 is 11.920 meters from the station in azimuth  $82^{\circ}59'$ .

**Bodie** (Washington, Ferry County; U. S. Coast and Geodetic Survey, 1925).—In the Colville National Forest, about 14 miles north by west of Republic, Washington. The station is about 8 meters northwest of the Bodie lookout house of the U. S. Forest Service and near the northwest edge of the rimrock on the summit of the mountain. The mountain is wooded on the north side, open on the south side, and the summit is lightly wooded.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in outcropping bedrock. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, wedged in a drill hole in outcropping bedrock near the southeast side of the rimrock, and is 19.662 meters from the station in azimuth  $288^{\circ}10'02''$ . Reference mark No. 2 is a like mark set in the same manner just southwest of the lookout house and is 12.596 meters from the station in azimuth  $347^{\circ}34'24''$ . Triangulation station "Bodie U. S. G. S." is 2.448 meters in azimuth  $45^{\circ}28'$  from the station.

**Greenwood** (British Columbia, Yale District; U. S. Coast and Geodetic Survey, 1925).—On the north end of the highest part of a mountain about 3 miles northwest of Greenwood, British Columbia. The summit of the mountain is partly bare and there are bare spots on the south side. There is a large square mineral-survey mark about 2 meters north of the station.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark set in a drill hole in a rock outcrop. The reference marks are standard Geodetic Survey of Canada reference marks set in drill holes in the outcropping rock. Reference mark No. 1 is 5.218 meters from the station in azimuth  $195^{\circ}13'$ . Reference mark No. 2 is 14.099 meters from the station in azimuth  $329^{\circ}00'$ .

**Leona** (Washington, Ferry County; U. S. Geological Survey; U. S. Coast and Geodetic Survey, 1925).—On Mount Leona in the Colville National Forest, about  $8\frac{1}{2}$  miles southeast of Malo, Washington. The station is on one of the highest points of the mountain. The mountain is heavily wooded on the north and sparingly on the south. Extensive clearing has been done around the station.

Station mark: The original station mark is a U. S. G. S. bronze disk set in a drill hole in the outcropping bedrock. The U. S. Coast and Geodetic Survey set a new station mark in 1925 about 8 inches southeast of the original station mark. The new station mark is a standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in the outcropping bedrock. The two reference marks are standard U. S. C. & G. S. bronze-disk reference marks, with the arrows pointing toward the U. S. C. & G. S. station mark, wedged in drill holes in the outcropping bedrock. Reference mark No. 1 is 7.836 meters from the U. S. C. & G. S. station in azimuth  $178^{\circ}33'$ ; reference mark No. 2 is 7.982 meters from the U. S. C. & G. S. station in azimuth  $331^{\circ}42'$ . The original station mark is 0.189 meter from the U. S. C. & G. S. station in azimuth  $135^{\circ}43'$ .

**Christina** (British Columbia, Yale District; U. S. Coast and Geodetic Survey, 1925).—On a high hill locally known as Baldy Mountain, about 10 miles by road and trail northeast of Grand Forks, British Columbia. It is about midway between Christina Lake and the North Fork of Kettle River. The station is on a very large rock outcrop but is surrounded by jack pines and therefore difficult to find. Considerable clearing has been done around the station.

**Station mark:** A standard Geodetic Survey of Canada station mark with two standard Geodetic Survey of Canada reference marks all set in rock outcrop. Reference mark No. 1 is 13.110 meters from the station in azimuth  $246^{\circ}04'20''$ ; reference mark No. 2 is 10.582 meters from the station in azimuth  $338^{\circ}30'13''$ .

**O'Toole** (Washington, Stevens County; U. S. Coast and Geodetic Survey, 1925).—On the highest point of O'Toole Mountain, about 12 miles southwest of Northport, Washington, and about  $2\frac{1}{2}$  miles southeast of Marble, Washington.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in outcropping bedrock. The two reference marks are standard U. S. C. & G. S. bronze-disk reference marks, with the arrows pointing toward the station, wedged in drill holes in the outcropping bedrock. Reference mark No. 1 is 4.384 meters from the station in azimuth  $206^{\circ}27'$ ; reference mark No. 2 is 20.178 meters from the station in azimuth  $152^{\circ}43'$ .

**Glory** (British Columbia, Kootenay West District; U. S. Coast and Geodetic Survey, 1925).—On the highest point of Old Glory Mountain, about 13 miles by road and trail northwest of Rossland, British Columbia. Old Glory Mountain is easily recognized by its extreme height above the surrounding mountains and by its almost vertical slope on the north side.

**Station mark:** A standard Geodetic Survey of Canada bronze-disk station mark set in rock outcrop. There is said to be a reference mark set by the reconnaissance party, but it was not found by the observing party.

**Kelly** (British Columbia, Kootenay West District; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1934).—On the highest point, and near the north end, of the range of mountains lying north of the International Boundary and east of the Columbia River and known as the Gold Range. It is about  $8\frac{1}{2}$  miles by road and trail from Fruitvale, British Columbia. The summit of the mountain is mostly bare and grassy, but there are a few scrubby trees on it. This is not Kelly Mountain.

**Station mark:** A standard Geodetic Survey of Canada bronze-disk station mark set in solid rock outcrop. There are two standard Geodetic Survey of Canada reference marks set as follows: Reference mark No. 1 is 4.634 meters from the station in azimuth  $134^{\circ}38'$ ; reference mark No. 2 is 12.173 meters from the station in azimuth  $209^{\circ}41'$ .

**Hall** (Washington, Pend Oreille County; U. S. Coast and Geodetic Survey, 1925).—On the highest point of Hall Mountain, about 10 miles southeast of Metaline Falls, Washington, about 10 miles northeast of Ione, Washington, and about  $1\frac{1}{2}$  miles east of Sullivan Lake. The mountain is wooded on all sides except an open spot on the south side running down from the top for about one-half mile. The station may be reached from either end of Sullivan Lake.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in outcropping bedrock. The two reference marks are standard U. S. C. & G. S. bronze-disk reference marks, with the arrows pointing toward the station, wedged in drill holes in the outcropping bedrock. Reference mark No. 1 is 6.115 meters (slope measurement) from the station in azimuth  $14^{\circ}13'$ . Reference mark No. 2 is 28.135 meters (slope measurement) from the station in azimuth  $105^{\circ}08'$ .

**Snowy** (Idaho, Boundary County; U. S. Geological Survey; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1934).—In the extreme northwest corner of Idaho, about 35 miles by road and trail northeast of Metaline Falls, Washington. The station is on the highest point of the southern part of Snowy Top Mountain about one-half mile south of Monument 196 of the International Boundary.

**Station mark:** A standard U. S. G. S. bronze-disk station mark set in outcropping rock. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, wedged in a drill hole in outcropping bedrock 13.483 meters (slope measurement) from the station in azimuth  $313^{\circ}25'$ . Reference mark No. 2 is a like bronze disk set in the same manner 2.073 meters (slope measurement) from the station in azimuth  $196^{\circ}42'$ .

**Summit** (British Columbia, Kootenay West District; U. S. Coast and Geodetic Survey, 1925).—About 25 miles by road and trail northwest of Creston, British Columbia, and about 6 miles north and west of the forks of Summit Creek. The station is on the southernmost of two high peaks about one-half mile apart.

**Station mark:** A standard Geodetic Survey of Canada bronze-disk station mark wedged in a drill hole in outcropping bedrock. Reference mark No. 1 is a standard Geodetic Survey of Canada bronze-disk reference mark, with the arrow pointing toward the station, wedged in a drill hole in outcropping bedrock 7.328 meters from the station in azimuth  $175^{\circ}41'$ . Reference mark No. 2 is a like mark set in the same manner 11.726 meters from the station in azimuth  $99^{\circ}54'$ .

**Parker** (Idaho, Boundary County; U. S. Coast and Geodetic Survey, 1925).—About 16 miles by road and trail southwest of Porthill, Idaho, on the highest point of Parker Peak, between Parker and Canyon Creeks.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in outcropping bedrock. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk station mark, with the arrow pointing toward the station, set in a drill hole in a boulder 7.299 meters from the station in azimuth  $176^{\circ}16'54''$ . Reference mark No. 2 is a like bronze disk set in the same manner 9.898 meters from the station in azimuth  $54^{\circ}55'40''$ .



**Kid** (British Columbia, Kootenay East District; U. S. Coast and Geodetic Survey, 1925).—About 20 miles by trail northeast of Kitchener, British Columbia, on the southernmost high peak of the divide between Kid Creek and Goat River.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark wedged in a drill hole in outcropping bedrock. Reference mark No. 1 is a standard Geodetic Survey of Canada bronze-disk reference mark, with the arrow pointing toward the station, wedged in a drill hole in bedrock 14.209 meters from the station in azimuth  $357^{\circ}18'$ . Reference mark No. 2 is a like bronze disk set in the same manner 5.846 meters from the station in azimuth  $57^{\circ}10'$ .

**Ewing** (Montana, Lincoln County; U. S. Geological Survey; International Boundary Commission, 1903; U. S. Coast and Geodetic Survey, 1925).—On the summit of a mountain about 5 miles south of the International Boundary and about 3 miles east of the Montana-Idaho line. It is about 15 miles by trail northeast of the U. S. Forest Service ranger station "Snyder" which is on the old Bonners Ferry-Eastport highway.

Station mark: A copper bolt set in a loose rock with a cairn built over it. In 1925 the U. S. Coast and Geodetic Survey recovered the station and set a new station mark, a standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in outcropping bedrock. Two reference marks were established; both are crosses cut in loose rocks. Reference mark No. 1 is 5.640 meters from the new station in azimuth  $299^{\circ}14'$ . Reference mark No. 2 is 9.132 meters from the new station in azimuth  $77^{\circ}26'$ . The original station mark is 5.62 meters from the new station in azimuth  $86^{\circ}57'15''$ .

**Moyie** (British Columbia, Kootenay East District; U. S. Coast and Geodetic Survey, 1925).—At the Moyie lookout station of the British Columbia Forest Service, about 8 miles by road and trail from the town of Moyie, British Columbia.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark wedged in a drill hole in outcropping bedrock. The two reference marks are standard Geodetic Survey of Canada bronze-disk reference marks wedged in drill holes in outcropping bedrock. Reference mark No. 1 is 19.207 meters from the station in azimuth  $206^{\circ}07'$ . Reference mark No. 2 is 10.510 meters from the station in azimuth  $114^{\circ}16'$ . The southeast corner of the lookout cabin is 12.60 meters from the station in azimuth  $151^{\circ}53'$ .

**Yaak** (Montana, Lincoln County; U. S. Geological Survey; International Boundary Commission, 1903; U. S. Coast and Geodetic Survey, 1925; 1934).—On the highest point of Yaak, or Robinson, Mountain in the Purcell Range, about  $2\frac{1}{4}$  miles south of the International Boundary and about  $11\frac{1}{2}$  miles west of Gateway, Montana. The station is best reached from the Dodge Creek and Yaak River road from Rexford, Montana, to Bonners Ferry, Idaho.

Station mark: A standard U. S. G. S. bronze-disk station mark set in a rock 8 by 24 by 24 inches in size and firmly planted in the ground. A drill hole in rock, marking the eccentric station occupied in 1934, is 4.91 meters from the station in azimuth  $178^{\circ}17'$ . In 1925 the U. S. Coast and Geodetic Survey recovered the station and established a new station within about a foot of the original station. The new station mark is a standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in outcropping bedrock. Two standard U. S. C. & G. S. bronze-disk reference marks, with the arrows pointing toward the station, are wedged in drill holes in outcropping bedrock. Reference mark No. 1 is 15.257 meters from the U. S. C. & G. S. station in azimuth  $265^{\circ}18'$ . Reference mark No. 2 is 4.850 meters from the U. S. C. & G. S. station in azimuth  $62^{\circ}22'$ . The original station mark is 0.388 meter from the station in azimuth  $267^{\circ}03'$ . A U. S. Forest Service lookout house stands a few feet to the east of the station marks.

**Broadwood** (British Columbia, Kootenay East District; U. S. Coast and Geodetic Survey, 1925).—On the highest peak of the mountain locally known as "Baldy", about 6 miles southeast of Elko, British Columbia.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark wedged in a drill hole in outcropping bedrock. The two reference marks are standard Geodetic Survey of Canada bronze-disk reference marks wedged in drill holes in outcropping bedrock. Reference mark No. 1 is 4.948 meters from the station in azimuth  $68^{\circ}28'$ . Reference mark No. 2 is 13.950 meters from the station in azimuth  $35^{\circ}43'$ .

**Green** (Montana, Lincoln County; C. H. Sinclair, 1903; U. S. Coast and Geodetic Survey, 1925).—On the highest point of Green Mountain, a bare peak on the crest of the Galton Range, about 2.6 miles south of the International Boundary and about 8 miles northeast of Eureka, Montana. The Phillipps Creek-Wigwam River trail crosses the ridge in the saddle to the north of the station.

Station mark: The original station mark was a drill hole in a stone set in the shale rock. In 1925 the U. S. Coast and Geodetic Survey recovered the station and buried the original stone for a subsurface mark and placed a standard U. S. C. & G. S. bronze-disk station mark in a drill hole in a stone block 9 by 24 by 28 inches for a surface mark. They set two standard U. S. C. & G. S. bronze-disk reference marks, with the arrows pointing toward the station, one in rock outcrop, and one in a stone block 10 by 10 by 16 inches, but did not record the distances and directions.

**Frost** (British Columbia, Kootenay East District; C. H. Sinclair, 1903; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1932).—On a rounding, grassy hill on the east side of the Kootenay River, about one-half mile east of the town of Flagstone, British Columbia.



**Station mark:** A drill hole in the top of a granite post, 6 by 6 by 48 inches, the upper 6 inches dressed. The post is set in the ground to the depth of 40 inches leaving 8 inches projecting above the ground. The letters "U. S. C. B." are cut in the corners of the top of the post. In 1925 the U. S. Coast and Geodetic Survey recovered the station and placed a subsurface mark under the original granite post. The subsurface mark is a Geodetic Survey of Canada standard bronze-disk station mark set in a block of concrete 3 feet below the surface of the ground. When the granite post was replaced, a Geodetic Survey of Canada standard bronze-disk station mark was placed in the drill hole in the top of it for the surface mark. A Geodetic Survey of Canada standard bronze-disk reference mark was then set in an irregular mass of concrete 37.21 meters from the station in azimuth  $142^{\circ}50'$ .

**Campbell** (Montana, Lincoln County; C. H. Sinclair, 1903; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1934).—About 3 miles south of Gateway, Montana, on the east side of the Kootenai River and about three-fourths mile east of the Gateway-Eureka road. The station is on the north end of a sparsely wooded ridge that rises about 100 feet above the valley. It is about 125 meters north of the north fence line of the Clough ranch, which crosses the ridge near its crest.

**Station mark:** A drill hole in the top of a granite post, 6 by 6 by 48 inches, the upper 6 inches dressed. The post is set in the ground to a depth of 40 inches, leaving 8 inches projecting above the surface. The letters "U. S. C. B." are cut in the corners of the top of the post. In 1925 the U. S. Coast and Geodetic Survey set one of their standard bronze-disk station marks in the drill hole in the top of the post and set one of their standard bronze-disk reference marks, with the arrow pointing toward the station, in a square block of concrete 90.70 meters from the station in azimuth  $358^{\circ}36'33''$ .

**Tuchuck** (Montana, Flathead County; U. S. Geological Survey; International Boundary Commission, 1903; U. S. Coast and Geodetic Survey, 1925; 1933).—On the highest point of Tuchuck Mountain, a high, pyramidal, bare peak about 9 miles west of the Flathead River and about  $1\frac{1}{4}$  miles south of the International Boundary.

**Station mark:** A standard U. S. G. S. bronze-disk station mark set in a green schist rock. The U. S. Coast and Geodetic Survey recovered the station in 1925 and re-marked the point by using the original disk and stone for a subsurface mark and placing a standard U. S. C. & G. S. bronze-disk station mark in a large block of stone above it. Two reference marks were set in rock outcrop but no other record of them is given. All three of the marks were stamped "Tuchuch" by mistake instead of "Tuchuck."

**Scarpe** (British Columbia, Kootenay East District; Alberta, MacLeod District; U. S. Coast and Geodetic Survey, 1924).—On the Continental Divide, on the highest point of the south peak of Scarpe Mountain. The station is about midway between the headwaters of Commerce and Pass Creeks, both tributary to the Flathead River.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark set in a drill hole in an outcropping boulder. Two like marks set in a similar manner were set for references. Reference mark No. 1 is 10.85 meters from the station in azimuth  $218^{\circ}08'$ . Reference mark No. 2 is 8.42 meters from the station in azimuth  $53^{\circ}43'$ .

**Sunkist** (British Columbia, Kootenay East District; U. S. Coast and Geodetic Survey, 1924).—On the high peak at the south end of the Sunkist Ridge about 3 miles south of Sunkist Peak and about 11 miles north of the International Boundary. The station peak rises very abruptly from the north side of Sage Creek at a point about 2 miles downstream from the mouth of Sunkist Brook. The station is about 6 meters down the southeast side from the top of the mountain.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in an outcropping boulder. A like mark is set in the same manner for a reference mark, 7.53 meters from the station in azimuth  $154^{\circ}00'$ .

**Carter** (Montana, Flathead County; U. S. Coast and Geodetic Survey, 1924).—On the highest point of Mount Carter in Glacier National Park. The station is about 1 mile southeast of the head of Bowman Lake. It is a 5,800-foot climb from the head of the lake to the station.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in a boulder. A standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, is wedged in a drill hole in an outcropping boulder 5.214 meters from the station in azimuth  $76^{\circ}16'$ .

**Dungarvan** (Alberta, MacLeod District; U. S. Coast and Geodetic Survey, 1924).—On the highest point of Mount Dungarvan, in Waterton Lakes Park, about 7 miles northwest of Waterton Lakes Park hotel and office. Mount Dungarvan is the highest peak in the vicinity and lies between the headwaters of Dungarvan Creek to the north and a tributary of Blakiston Brook to the south.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in a large flat boulder. The two reference marks are standard U. S. C. & G. S. bronze-disk station marks wedged in drill holes in boulders. Reference mark No. 1 is 5.812 meters from the station in azimuth  $199^{\circ}59'$ . Reference mark No. 2 is 6.828 meters from the station in azimuth  $253^{\circ}50'$ .

**Crossley** (Montana, Glacier County; U. S. Coast and Geodetic Survey, 1924).—On a sharp peak on the Crossley ridge in Glacier National Park. This ridge lies to the east of Glens Lake. The station is about one-half mile northeast of Mount Merritt and on the same ridge.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in a boulder. The two reference marks are standard U. S. C. & G. S. bronze-disk reference marks, with the arrows pointing toward the station, wedged in drill holes in boulders. Reference mark No. 1 is 14.025 meters from the station in azimuth  $6^{\circ}01'$ . Reference monument No. 2 is 20.540 meters from the station in azimuth  $186^{\circ}27'$ .

**Beazer** (Alberta, Lethbridge District; U. S. Coast and Geodetic Survey, 1923).—On the southwestern of two prominent knolls, about 8 miles west and 8 miles south of Cardston, Alberta, about  $1\frac{1}{2}$  miles south-by-east of Beazer post office, Alberta, and in the southeast corner of NW $\frac{1}{4}$  sec. 6, T. 2, R. 26 W., fourth meridian. The northeastern of the two knolls is a few feet lower and its top is covered with small pine trees; while the southwestern one, on which the station is situated, has only a few trees on its west slope and its top is rounding and grassy. These knolls are about 250 meters apart on the same hill, the only high hill in the vicinity with trees on its top.

Station mark: The subsurface mark is a standard Geodetic Survey of Canada bronze-disk station mark set in a concrete block, 12 by 12 by 9 inches, set 27 inches below the surface of the ground. The surface mark is a like bronze disk set in a concrete block 16 by 16 inches square at the top, 24 by 24 inches square at the bottom, 28 inches in depth, and projecting about 4 inches above the surface of the ground. A standard Geodetic Survey of Canada bronze-disk reference mark set in a concrete block similar to the surface mark is 77.70 meters from the station in azimuth  $340^{\circ}16'54''$ .

**Cracker** (Montana, Glacier County; U. S. Coast and Geodetic Survey, 1924).—In Glacier National Park on the highest point of the ridge that lies to the south and east of Cracker Lake. The station is about one mile south of Cracker Lake and about one-half mile southwest of Mount Siyeh, which is on the same ridge but separated from the station peak by a very deep saddle.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in a large, flat boulder.

**Divide** (Montana, Glacier County; U. S. Coast and Geodetic Survey, 1923).—On the Hudson Bay Divide, between the waters of St. Mary River on the west and Milk River on the east. The station is about 3 miles east and 3 miles south of Babb post office, Montana, and about 2 miles east of Lower St. Mary Lake. It is about 200 meters northeast of an old wagon road crossing the ridge in a northwesterly direction, and about one-third mile north of the edge of the dense, small timber that covers the southern portion of the ridge. There are patches of fir timber on the west slope near the station and clumps of fir and quaking asp on the east side. The station can be reached from the Browning-Babb stage road by following it to the Percival ranch and there taking an old road leading up the ridge to the west.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in the top of a concrete block 16 by 16 inches square at the top, 24 by 24 inches square at the bottom, 28 inches in depth, and projecting 4 inches above the surface of the ground. The subsurface mark is a like bronze disk set in a block of concrete 12 by 12 by 9 inches in size, placed 27 inches below the surface of the ground.

**Mussetter** (Montana, Glacier County; U. S. Coast and Geodetic Survey, 1923).—On a low, though prominent, flat-topped butte 2 miles north and 5 miles west of the Buck ranch on the South Fork of Milk River. It is about 2 miles west of the road leading northwest from the Buck ranch to the mouth of the U. S. Reclamation Service canal. Truck or wagon can be driven cross country to the station from nearly all directions.

Station mark: The surface mark is a standard U. S. C. & G. S. bronze-disk reference mark on which the word "reference" has been cut out and the word "triangulation" substituted; a small triangle has been cut around the center. The disk is set in the top of a concrete block 16 by 16 inches square at the top, 24 by 24 inches square at the bottom, and 28 inches deep, projecting 4 inches above the surface of the ground. The subsurface mark is a standard U. S. C. & G. S. bronze-disk reference mark, stamped "SUB-SURF", set in a concrete block, 12 by 12 by 10 inches in size, set 27 inches under the ground. Triangulation station "Lincoln", marked by a standard U. S. Geological Survey bench-mark post, is 3.41 meters from the station in azimuth  $60^{\circ}19'53''$ . Station "G. L. O. No. 52" is about 200 meters southwest of the station.

**Ross** (Alberta, Lethbridge District; U. S. Coast and Geodetic Survey, 1923).—About 17 miles south and 2 miles west of Magrath, Alberta, and one mile north of Ross Lake. The station is in NW $\frac{1}{4}$  sec. 32, T. 2, R. 22 W., fourth meridian. It is in a pasture, on the highest knoll in the vicinity, and 365 meters southwest of a fence line.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark set in the top of a concrete block 16 inches square at the top, 24 inches square at the bottom, 28 inches deep, and projecting 4 inches above the ground. The subsurface mark is a like disk set in a concrete block 12 by 12 by 9 inches in size, placed 27 inches under the surface of the ground. A standard Geodetic Survey of Canada bronze-disk reference mark set in a boulder surrounded by concrete is 364.39 meters from the station in azimuth  $38^{\circ}45'20''$ .

**Landslide** (Montana, Glacier County; U. S. Geological Survey; U. S. Coast and Geodetic Survey, 1923).—On a prominent hill known as Landslide Butte, the highest hill in the vicinity, identified by the landslide at its west end. The station is about 5 miles northeast of Buffalo Lake and is near the center of NW¼ sec. 3, T. 36 N., R. 8 W., principal meridian. It may be reached by taking the Cut Bank-Milk River road from Cut Bank, Montana. This road passes near the butte at a distance of about 30 miles from Cut Bank.

**Station mark:** The U. S. G. S. mark is a standard iron post with a bronze cap of that survey. The U. S. C. & G. S. mark is a standard U. S. C. & G. S. bronze-disk station mark set in a concrete block 16 by 16 inches square at the top, 24 by 24 inches at the bottom, 28 inches deep, and projecting 4 inches above the surface of the ground. The subsurface mark is a like bronze disk set in a concrete block 12 by 12 by 9 inches in size and set 27 inches below the surface of the ground. The azimuth and distance between the two stations are not given.

**Ridge** (Montana, Glacier County; C. H. Sinclair, 1910; U. S. Coast and Geodetic Survey, 1923).—About 7 miles north and 2½ miles east of the Buck ranch on the South Fork of Milk River, ¼ miles south of International Boundary Monument 305, and in sec. 11, T. 37 N., R. 10 W., principal meridian. The station is on the south end of the first ridge south of a prominent rounding knoll having a pile of rocks on its top. It is three-fourths mile south of the knoll.

**Station mark:** The original station mark is an International Boundary Commission bronze-disk station mark set in concrete with a cairn built over it. The U. S. C. & G. S. mark is their standard bronze-disk station mark set in a concrete block 16 inches square at the top, 24 inches square at the bottom, 28 inches deep, and projecting 4 inches above the ground. The U. S. C. & G. S. subsurface mark is a like bronze disk set in a concrete block 12 by 12 by 9 inches in size and placed 27 inches underground. The original station mark is 3.735 meters from the U. S. C. & G. S. station in azimuth 356°10'59".

**Boundary West Base** (Alberta, Lethbridge District; U. S. Coast and Geodetic Survey, 1923).—On the crest of the ridge that crosses the International Boundary between Monuments 303 and 304. The station is a few feet north of the boundary line, in the Canadian road allowance and near the northeast corner of sec. 5, T. 37 N., R. 10 W., principal meridian, United States Land Office surveys. It is about three-fourths mile west of Monument 304.

**Station mark:** The subsurface mark is a standard U. S. C. & G. S. bronze-disk station mark set in a concrete block 12 by 12 by 9 inches, placed 27 inches underground. The surface mark is a like bronze disk set in the top of a concrete block 16 by 16 inches square at the top, 24 by 24 inches square at the bottom, and 28 inches in depth, projecting about 4 inches above the surface of the ground. Monument 304 is 1,448.2 meters from the station in azimuth 269°58'18". Level bench mark No. 55, an iron pipe with cap inscribed "B. M.", is 44.96 meters from the station in azimuth 125°54'47".

**Boundary East Base** (Alberta, Lethbridge District; U. S. Coast and Geodetic Survey, 1923).—On a plateau about one-fourth mile east of International Boundary Monument 309 and about 6 meters north of the boundary line, in the Canadian road allowance. The station is near the edge of the plateau where the terrain slopes steeply to the southeast to the valley of the South Fork of Milk River. The base was measured westward from this point parallel to the boundary.

**Station mark:** The subsurface mark is a standard U. S. C. & G. S. bronze-disk station mark set in a block of concrete, 12 by 12 by 9 inches, placed 27 inches below the surface of the ground. The surface mark is a like bronze disk set in the top of a square concrete block, 16 by 16 inches at the top, 24 by 24 inches at the bottom, and 28 inches in depth, placed so that it projects about 4 inches above the ground. There are no reference marks.

**Meeks** (Alberta, Lethbridge District; U. S. Coast and Geodetic Survey, 1923).—About 13 miles west and 4 miles north of Milk River, Alberta, and on the south side of the highest range of hills to the north of Milk River. The station is in the Meeks pasture to the west of the Rollen lease and is estimated to be in SE¼ sec. 17 or SW¼ sec. 16, T. 3, R. 18 W., fourth meridian.

**Station mark:** A standard Geodetic Survey of Canada bronze-disk station mark set in the top of a concrete block 16 inches square at the top, 24 inches square at the bottom, 28 inches deep, and projecting 4 inches above the ground. The subsurface mark is a like bronze disk set in a concrete block 12 by 12 by 9 inches in size, 27 inches underground.

**Senior** (Alberta, Lethbridge District; U. S. Coast and Geodetic Survey, 1923).—About 12 miles west and 5 miles north of Sweetgrass, Montana, 5 miles south and 7 miles west of Milk River, Alberta, in the southwest corner of the SE¼ sec. 32, T. 1, R. 17 W., fourth meridian, and about 200 meters northeast of the quarter-section corner on the south line of the section. The station is on the highest point of the northeast knoll of the high range of hills lying between Milk River on the north and the International Boundary on the south.

**Station mark:** A standard Geodetic Survey of Canada bronze-disk station mark set in the top of a concrete block 16 inches square at the top, 24 inches square at the bottom, 28 inches deep, and projecting 4 inches above the surface of the ground. The subsurface mark is a like disk set in a concrete block 12 by 12 by 9 inches in size and placed 27 inches underground. Reference mark No. 1 is a standard Geodetic Survey of Canada bronze-disk

reference mark set in the top of a concrete block 14 inches square at the top, 26 inches deep, projecting 4 inches above the ground, and in a fence line, 61.98 meters from the station in azimuth  $343^{\circ}45'14''$ . Reference mark No. 2 is a like bronze disk set in an outcropping boulder, 151.24 meters from the station in azimuth  $118^{\circ}27'56''$ .

**McCormick** (Montana, Toole County; U. S. Coast and Geodetic Survey, 1923).—About 10 miles south and 8 miles west of Sweetgrass, Montana, about 7 miles north and 7 miles west of Kevin, Montana, and  $1\frac{1}{4}$  miles south and  $1\frac{1}{2}$  miles east of Demers post office at Fitzpatrick Lake. The station is in SE  $\frac{1}{4}$  sec. 21, T. 36 N., R. 4 W., principal meridian, and is about 100 meters north of the south line of the section. It is 16 meters northeast of Mrs. Martha McCormick's house, 14 meters southeast of a drilled well, and is on the highest point of land in the vicinity.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in the top of a concrete block 16 inches square at the top, 24 inches square at the bottom, and 28 inches in depth, the upper 4 inches projecting above the ground. The subsurface mark is a like bronze disk set in a concrete block 12 by 12 by 9 inches in size and placed 27 inches underground. A standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, is set in the top of a concrete block similar to that of the station mark, but 14 inches square at the top and 26 inches deep, and projecting 4 inches above the ground. The reference mark is 107.56 meters from the station in azimuth  $8^{\circ}20'13''$ . The northeast corner of the concrete foundation of Mrs. McCormick's house is 16.65 meters from the station in azimuth  $41^{\circ}16'30''$ . The center of the drilled well casing is 15.10 meters from the station in azimuth  $121^{\circ}59'36''$ .

**Verdigris** (Alberta, Lethbridge District; U. S. Coast and Geodetic Survey, 1923).—About  $2\frac{1}{2}$  miles east and three-fourths mile north of Milk River, Alberta. The station is in NW  $\frac{1}{4}$  sec. 25, T. 2, R. 16 W., fourth meridian, and is about 450 meters east of the northwest corner of the section and about 50 meters south of the wire fence on the north line of the section. It is in a cultivated field on the divide between Milk River on the south and Verdigris Lake on the north and is on the highest ground in the vicinity.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark set in the top of a concrete block 16 inches square at the top, 24 inches square at the bottom, 28 inches deep, and projecting 4 inches above the ground. The subsurface mark is a like bronze disk set in a concrete block 12 by 12 by 9 inches in size and placed 27 inches underground. A standard Geodetic Survey of Canada bronze-disk reference mark is set in a concrete block 14 inches square at the top, 26 inches deep, and projecting 3 inches above the surface of the ground. It is 45.35 meters from the station in azimuth  $163^{\circ}28'54''$ .

**West Butte** (Montana, Toole County; U. S. Coast and Geodetic Survey, 1923).—On the highest point of West Butte, one of the Sweetgrass Hills. It is about  $4\frac{1}{2}$  miles south of the International Boundary and is about  $1\frac{1}{2}$  miles northeast of West Butte post office, Montana. A bronze disk, unmarked, cemented in a boulder embedded in the ground was found on the summit of the butte. No record of what this mark was for has been found. It is now used as a reference mark.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in concrete in a depression in a boulder. The subsurface mark is a like bronze disk set in concrete in a depression in a boulder 3 feet underground. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, set in concrete in a depression in a boulder, 14.97 meters from the station in azimuth  $147^{\circ}40'37''$ . Reference mark No. 2 is the bronze disk that was found on the station site; it is 7.986 meters from the station in azimuth  $334^{\circ}06'18''$ .

**Kippen** (Alberta, Lethbridge District; U. S. Coast and Geodetic Survey, 1923).—About 36 miles by road northeast of Sweetgrass, Montana, about 5 miles by road northeast of the Kippen post office, and about 2 miles south and one-half mile east of the Lucky Strike post office. It is on the highest point in the vicinity. The station is in NW  $\frac{1}{4}$  sec. 7, T. 3, R. 11 W., fourth meridian, and is approximately 290 meters south of the north section line and 550 meters east of the west section line.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk set in a block of concrete 3 feet underground. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, set in a square block of concrete 288.02 meters from the station in azimuth  $134^{\circ}34'15''$ . Reference mark No. 2 is a like bronze disk set in a similar manner 553.48 meters from the station in azimuth  $167^{\circ}18'34''$ .

**Hill** (Montana, Liberty County; U. S. Coast and Geodetic Survey, 1923).—On the top of the most northeastern of the Sweetgrass Hills. This mountain culminates in a double peak, the two points being nearly north and south of each other and about 1.4 miles apart. The station is on the southern and slightly lower of the two peaks. Station "Sweetgrass" is on the northern and higher peak.

Station mark: The station mark is not recorded but is probably a standard U. S. C. & G. S. bronze-disk station mark set in rock.

**Antelope** (Alberta, Medicine Hat District; U. S. Coast and Geodetic Survey, 1923).—On the highest point of a ridge extending in a northwesterly and southeasterly direction about 6 miles north and one-half mile west

of Monument 366 of the International Boundary. The station is in the south half of SE $\frac{1}{4}$  sec. 1, T. 2, R. 8 W., fourth meridian, and is about 400 meters northwest of the southeast corner of the section.

Station mark: A standard bronze-disk station mark set in the top of a square post of concrete. The subsurface mark is a like bronze disk set in a block of concrete 3 feet underground. The reference mark is a standard bronze-disk reference mark, with the arrow pointing toward the station, set in the top of a square post of concrete 413.09 meters from the station in azimuth 305°20'34". The reference mark is at the southeast corner of the section.

**Pinhorn** (Alberta, Medicine Hat District; U. S. Coast and Geodetic Survey, 1923).—About one-half mile north of Monument 367 of the International Boundary, and about 3 $\frac{1}{4}$  miles east and one-half mile north of the Pinhorn customhouse. It is near the center of sec. 6, T. 1, R. 7 W., fourth meridian. The station is on a small knoll which is the highest ground in the vicinity.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark set in a square block of concrete 16 by 16 by 38 inches. The subsurface mark is a like bronze disk set in a concrete block 10 by 10 by 10 inches, 3 feet underground. There are no reference marks.

**Milk** (Alberta, Medicine Hat District; U. S. Coast and Geodetic Survey, 1923).—Nearly due north of Joplin, Montana, and about 5 miles north and 1 mile east of Monument 371 of the International Boundary. It is near the middle of the south side of sec. 28, T. 1, R. 6 W., fourth meridian. The station is on the highest point of a conical hill, the highest in the vicinity.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk set in a square block of concrete 3 feet underground. Reference mark No. 1 is a standard Geodetic Survey of Canada bronze-disk reference mark with the arrow pointing toward the station set in a square block of concrete 104.84 meters from the station in azimuth 233°15'50". Reference mark No. 2 is a like mark set in a similar manner 135.77 meters from the station in azimuth 15°11'02".

**New** (Montana, Liberty County; U. S. Coast and Geodetic Survey, 1923).—About 28 miles due north of Joplin, Montana, about 3 miles south of the International Boundary, 2 $\frac{1}{4}$  miles northeast of a white schoolhouse, and about one-fourth mile southeast of a large oil derrick. It is on top of a flat ridge and is on the north line of sec. 14, T. 37 N., R. 7 W., principal meridian, and is not far from the quarter corner.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk set in a square block of concrete 3 feet underground. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, set in a square block of concrete 43.11 meters from the station in azimuth 270°05'10". Reference mark No. 2 is a like bronze disk, wedged in a drill hole in a boulder, 42.90 meters from the station in azimuth 90°19'38".

**Joplin** (Montana, Liberty County; U. S. Coast and Geodetic Survey, 1923).—About 2 miles north and 1 $\frac{1}{2}$  miles east of Joplin, Montana, on a small knoll on the highest point of a high prominent ridge, and about 150 meters northwest of the point where a good road crosses the ridge. It is near the northwest corner of SE $\frac{1}{4}$  sec. 30, T. 33 N., R. 8 E., principal meridian.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk set in a block of concrete 3 feet underground. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, wedged in a drill hole in an outcropping boulder 151.45 meters from the station in azimuth 66°04'19". Reference mark No. 2 is a like bronze disk set in a similar manner 107.70 meters from the station in azimuth 125°04'14".

**Goldstone** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923).—About 21 miles north and 3 miles east of Rudyard, Montana, and about 8 miles south of the International Boundary. It is 1 $\frac{1}{4}$  miles east of the old Gold Stone post office and store, and is on the highest point of a large flat-topped ridge. The station is in the northeast corner of NW $\frac{1}{4}$  sec. 13, T. 36 N., R. 9 E., principal meridian.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk wedged in a drill hole in a boulder set 3 feet underground. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, wedged in a drill hole in a boulder 332.63 meters from the station in azimuth 179°04'15". Reference mark No. 2 is a like mark set in a square block of concrete at an unrecorded distance from the station in azimuth 267°05'14".

**Sage** (Alberta, Medicine Hat District; U. S. Coast and Geodetic Survey, 1923).—On the highest point of a prominent flat-topped ridge about 27 miles west and 5 miles south of Govanlock, Saskatchewan, about 6 miles northeast of Onefour, Alberta, and about 10 miles north of the International Boundary. The station is about 25 meters north of a road which leads to an open coal vein.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk set in a square block of concrete 3 feet underground. Reference mark No. 1 is a standard Geodetic Survey of Canada bronze-disk reference mark, with the arrow pointing toward the station, set in a square block of concrete 103.39 meters from the station in azimuth 341°58'20". Reference mark No. 2 is a like mark set in the same manner 395.38 meters from the station in azimuth 83°24'33".

**Govanlock** (Saskatchewan, Maple Creek District; U. S. Coast and Geodetic Survey, 1923).—About 8 miles north of the International Boundary and about one-half mile east of the fourth principal meridian. It is about 6 miles south and  $7\frac{1}{2}$  miles west of Govanlock, Saskatchewan, and is on a small but prominent hill, the highest point in the vicinity, which is plainly visible to the southwest from Govanlock.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk set in a block of concrete 3 feet underground. Reference mark No. 1 is a standard Geodetic Survey of Canada bronze-disk reference mark, with the arrow pointing toward the station, set in a square block of concrete 23.17 meters from the station in azimuth  $223^{\circ}02'14''$ . Reference mark No. 2 is a like bronze disk set in a similar manner 20.33 meters from the station in azimuth  $308^{\circ}38'26''$ .

**Simpson** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923).—About 23 miles north and 12 miles west of Havre, Montana, in NE $\frac{1}{4}$  sec. 18, T. 36 N., R. 14 E., principal meridian. The station is on the highest point and near the northern extremity of a high and prominent ridge which runs in a northwesterly and southeasterly direction. The east line of the section is about 200 meters east of the station.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk set in a square block of concrete 3 feet underground. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk station mark, with the arrow pointing toward the station, set in a square block of concrete 32.68 meters from the station in azimuth  $242^{\circ}02'17''$ . Reference mark No. 2 is a like bronze disk set in the same manner 33.80 meters from the station in azimuth  $116^{\circ}15'10''$ .

**Signal** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923).—About 27 miles north and 6 miles west of Havre, Montana, and about 4 miles south of the International Boundary. It is on the highest point of Signal Butte near the northwest end of the ridge and is near the middle of the south side of sec. 20, T. 37 N., R. 15 E., principal meridian. An oil derrick and some newly constructed buildings stand about one-fourth mile to the westward of the station.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in a boulder. The subsurface mark is a standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in a boulder placed 3 feet underground. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, wedged in a drill hole in a boulder 28.02 meters from the station in azimuth  $257^{\circ}47'36''$ . Reference mark No. 2 is a like mark set in a similar manner 32.92 meters from the station in azimuth  $65^{\circ}15'14''$ . A bronze disk set in a drill hole in a boulder and marking International Boundary Commission station "Chinook" is 8.03 meters from the station in azimuth  $79^{\circ}52'30''$ .

**Nashlinn** (Saskatchewan, Maple Creek District; U. S. Coast and Geodetic Survey, 1923).—About 14 miles south and 1 mile west of Consul, Saskatchewan, and about 7 miles north of the International Boundary. It is on high ground about 50 meters east and 25 meters south of the northeast corner post of sec. 4, T. 2, R. 27 W., third meridian, and it is 25 meters east of the section-line road leading from Consul into Montana.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk set in a square block of concrete 3 feet underground. Reference mark No. 1 is a standard Geodetic Survey of Canada bronze-disk reference mark with the arrow pointing toward the station set in a square block of concrete 24.46 meters from the station in azimuth  $86^{\circ}39'48''$ . Reference mark No. 2 is a like mark set in a similar manner 22.21 meters from the station in azimuth  $175^{\circ}32'22''$ .

**Havre North Base** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923; 1925).—About 27 miles north and  $3\frac{1}{4}$  miles east of Havre, Montana, and about 4 miles south of the International Boundary. It is on the high ground in SW $\frac{1}{4}$  sec. 23, T. 37 N., R. 16 E., principal meridian, and is about 135 meters east of the west section line and road.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk set in a block of concrete 3 feet underground. References are standard U. S. C. & G. S. reference-mark disks, with the arrows pointing toward the station, set in square concrete blocks. Reference mark No. 1 is 19.32 meters from the station in azimuth  $253^{\circ}41'$ . Reference mark No. 2 is 22.27 meters from the station in azimuth  $7^{\circ}02'$ .

**Havre South Base** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923; 1925).—About 15 mile north and about 4 miles east of Havre, Montana, and about three-fourths mile northeast of Thibedean Lake. It is on the top of a small but prominent hill and near the west side of SW $\frac{1}{4}$  sec. 24, T. 35 N., R. 16 E., principal meridian.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk set in a boulder 3 feet underground. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark set in a square block of concrete 14.30 meters from the station in azimuth  $327^{\circ}16'34''$ . Reference mark No. 2 is an iron pipe surmounted by a bronze cap marking U. S. Geological Survey station "Thibedean" and is 5.95 meters from the station in azimuth  $103^{\circ}10'30''$ .

**Old Man** (Saskatchewan, Maple Creek District; U. S. Coast and Geodetic Survey, 1923).—About 24 miles south and 18 miles west of East End, Saskatchewan, and 12 miles north of the International Boundary. It is

on the highest point of the southernmost ridge of Old Man Plateau. The station is in the northeast corner of NW¼ sec. 36, T. 2, R. 25 W., third meridian. It is 2 meters west of the half-section-line fence and is one-half mile south of triangulation station "Divide."

**Station mark:** A standard Geodetic Survey of Canada bronze-disk station mark set in a square block of concrete. The substation mark is a like bronze disk set in a square block of concrete 3 feet underground. Reference mark No. 1 is a standard Canadian Geodetic Survey bronze-disk reference mark set in a square block of concrete 22.09 meters from the station in azimuth 356°57'40". Reference mark No. 2 is a like bronze disk set in a similar manner 22.71 meters from the station in azimuth 91°56'12".

**Cherry** (Montana, Blaine County; Geodetic Survey of Canada, 1922; U. S. Coast and Geodetic Survey, 1923).—About 19 miles north and about 12 miles east of Chinook, Montana, and on the top of one of the several ridges of about the same elevation known as the Cherry Ridges. It is on the northern one of two prominent hills near the northern extremity of the ridge, and is in SW¼ sec. 15, T. 36 N., R. 21 E., principal meridian. "West Cherry", a station of both the International Boundary Commission and of the U. S. Geological Survey, is located on a hill of about the same elevation about 525 meters west of station "Cherry."

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark set in a square block of concrete. The reference marks are two U. S. C. & G. S. standard bronze-disk reference marks, with the arrows pointing toward the station, wedged in drill holes in boulders. Reference mark No. 1 is 13.35 meters from the station in azimuth 45°02'58". Reference mark No. 2 is 17.88 meters from the station in azimuth 194°46'15".

**Lucky** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922; U. S. Coast and Geodetic Survey, 1923).—About 10 miles southwest of the town of Echo, Saskatchewan. It is about 6½ miles north of the International Boundary. It is on an irregular ridge running northwest and southeast and is on the highest point in the vicinity. It is in sec. 3, T. 2, R. 22 W., third meridian, and is near the east side of the section about midway north and south.

**Station mark:** Standard Geodetic Survey of Canada bronze-disk station marks set in standard concrete surface and subsurface piers. There are no reference marks. The southeast corner of sec. 3 is 876.1 meters south and a little east from the station.

**Claydon** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922; U. S. Coast and Geodetic Survey, 1923).—About 15 miles south and 4 miles west of East End, Saskatchewan, and 480 meters east of the East End-Claydon post office road. It is about 21 miles north of the International Boundary and is in NW¼ sec. 22, T. 4, R. 22 W., third meridian. The station is 82 meters south of a fence and 558.3 meters southeast of the northeast corner of sec. 21 of the above township and range. It is on land owned by Charles Ingham and is on the top of a knoll northeast of his house, the highest point in the vicinity, near the edge of a wheat field.

**Station mark:** Geodetic Survey of Canada standard bronze-disk station marks set in standard surface and subsurface concrete piers, the surface pier, 14 inches square, projecting 18 inches above the ground.

**Alkali** (Montana, Blaine County; Geodetic Survey of Canada, 1922).—On the highest butte in the vicinity, one-half mile east of a prominent cairn. The station is in NE¼ sec. 17, T. 37 N., R. 24 E., principal meridian.

**Station mark:** A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is the northeast corner of the above section, 549.3 meters from the station in azimuth 223°07'19".

**Rapdan** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—On the east side of the road allowance near the southwest corner of sec. 24, T. 3, R. 20 W., third meridian, on top of a high knoll.

**Station mark:** A standard Geodetic Survey of Canada station mark; see page 333. One reference mark is a Dominion Lands Survey post at the northeast corner of sec. 14, T. 3, R. 20 W., 35.28 meters from the station in azimuth 29°50'02". A second reference mark is the northeast corner of a church, 47.65 meters from the station, in a southwesterly direction.

**Center** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—Approximately 48 miles south of Shaunavon. The station is in NW¼ sec. 3, T. 2, R. 19 W., third meridian, on an inconspicuous knoll 42 meters north of a small frame house.

**Station mark:** A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a quarter-section post at the center of the east side of sec. 4, T. 2, R. 19 W., 210.43 meters from the station in azimuth 30°45'47". The northwest corner of the house is 42.5 meters from the station; the northeast corner is 42.1 meters from the station.

**Climax** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—In NW¼ sec. 10, T. 3, R. 18 W., third meridian. The station is on the highest knoll of a flat ridge which continues for about a mile to the southeast after a slight drop in that direction.

**Station mark:** A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the northeast corner of sec. 9, which is 536.15 meters from the station in azimuth 99°27'24".

**Big Butte** (Montana, Blaine County; Geodetic Survey of Canada, 1922).—In SE¼ sec. 17, T. 37 N., R. 26 E., principal meridian, on the highest point of a prominent ridge running southeast and northwest.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. One reference mark is the center of the south side of the above section, 619.0 meters from the station in azimuth  $78^{\circ}49'01''$ . A second reference mark is the southeast corner of the same section, 236.4 meters from the station.

**Edmund** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—In NW¼ sec. 32, T. 2, R. 16 W., third meridian. The station is on the east side of the road allowance near the center of the west side of the above quarter section. It is on top of a gradual slope and east of a house.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the northeast corner of sec. 31, T. 2 R. 16 W., 286.51 meters from the station in azimuth  $176^{\circ}02'15''$ .

**Porter** (Montana, Phillips County; Geodetic Survey of Canada, 1922).—On the most prominent point in the immediate vicinity, in SE¼ sec. 28, T. 37 N., R. 28 E., principal meridian.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is the southeast corner of the above section, 307.29 meters from the station in azimuth  $339^{\circ}22'18''$ .

**Roche** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—In sec. 6, T. 3, R. 14 W., third meridian, near the middle of the north side. The station is on the highest part of McArthur's Butte. A trail to the station comes in from the west.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Monchy** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—In NW¼ sec. 3, T. 1, R. 14 W., third meridian; on top of a high rounded butte.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the center of the west side of sec. 3, T. 1, R. 14 W., 558.35 meters from the station in azimuth  $14^{\circ}17'35''$ .

**70-Mile Butte** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1923).—On the western part of a flat isolated table of the hill known locally as 70-Mile Butte. The station may be reached from the Smith and Sammons ranch by going 1 mile west, 100 meters south, and one-fourth mile west over a good trail; thence over a little-used trail south through a barnyard; for one-half mile around the west end of a slough; and thence about 1 mile in a southerly direction up to a tableland. From this point the route lies first southeast past a large boulder and over a break, and thence south and west, as far as possible following a hogback to the flat isolated table. The station is near the center of the south side of sec. 11, T. 3, R. 13 W., third meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Whitewater** (Montana, Phillips County; Geodetic Survey of Canada, 1922).—In NW¼ sec. 6, T. 37 N., R. 32 E., principal meridian, three-tenths mile west and two-fifths mile south of International Boundary Monument 470. The station is on the highest, though not prominent, point in the vicinity.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office post at the center of the west side of the above section, 558.5 meters from the station in azimuth  $56^{\circ}04'37''$ .

**Long** (Montana, Phillips County; International Boundary Commission, 1910; Geodetic Survey of Canada, 1923).—About 3 miles south of International Boundary Monument 482, near the southeast corner and the south side of SW¼ sec. 17, T. 37 N., R. 34 E., principal meridian. The station is on the highest part of the highest ground east of Frenchman Creek, and is about 30 meters north of a fence near the edge of the steep valley of the creek.

Station mark: The original mark was replaced by a standard U. S. Coast and Geodetic Survey mark in 1923; see page 333. The reference mark is the center of the south side of the above section, 207.00 meters from the station in azimuth  $289^{\circ}08'06''$ .

**Wideview** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1923).—The station may be reached by following the Reliance Trail for 4½ miles from Wideview, then proceeding south along a ravine for one-fourth mile, and thence south along a faintly marked trail to a tableland. The station is in the northwest corner of NE¼ sec. 11, T. 4, R. 10 W., third meridian, at the north end of the tableland about 150 feet from its west edge.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the center of the north side of sec. 11 165.20 meters from the station in azimuth  $119^{\circ}39'21''$ .

**Blum** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—Twelve miles south of Wideview or 45 miles south of Hazenmore in NE¼ sec. 20, T. 2, R. 9 W., third meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the Dominion Lands Survey post marking the center of the east side of the above section, 186.2 meters from the station in azimuth  $316^{\circ}59'23''$ .



**Peaked Butte** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—On the highest peak of three at a point where a ridge from the west bends sharply to the south. The station is in SW¼ sec. 6, T. 3, R. 6 W., third meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the Dominion Lands Survey post at the southeast corner of sec. 1, T. 3, R. 7 W., 512.89 meters from the station in azimuth 30°00'17".

**Thoeny** (Montana, Valley County; Geodetic Survey of Canada, 1923).—In NE¼ sec. 13, T. 36 N., R. 37 E., principal meridian. The station is 4½ miles east of Thoeny, on the road to Opheim. It is one-third mile north of a bend toward the north in that road, and on the highest point just west of a sharp turn toward the east of the north branch of the same road.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office post at the center of the west side of the above section, 1,274.60 meters from the station in azimuth 69°00'22".

**Clay Butte** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—On top of a clay butte 6 miles due east of Southview post office. The station is in SW¼ sec. 3, T. 3, R. 5 W., third meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post marked "II, V," at the northeast corner of sec. 33, T. 2, R. 5 W., 246.71 meters from the station in azimuth 294°07'10".

**Roanwood** (Montana, Valley County; Geodetic Survey of Canada, 1923).—On the edge of a sharp change of slope, in the northwest corner of SE¼ sec. 36, T. 37 N., R. 39 E., principal meridian.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office post at the southeast corner of the above quarter section, 944.68 meters from the station in azimuth 302°01'25".

**Glentana** (Montana, Valley County; Geodetic Survey of Canada, 1923).—Near the edge of a tableland overlooking the Poplar River valley. The station is near the center of the north side of SE¼ sec. 11, T. 36 N., R. 41 E., principal meridian.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office post at the southeast corner of the above section, 871.74 meters from the station in azimuth 324°36'31".

**Table Butte** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—On the highest point in SE¼ sec. 13, T. 2, R. 3 W., third meridian, about three-fourths mile east by south from Table Butte.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the northeast corner of sec. 12, T. 2, R. 3 W., 328.47 meters from the station in azimuth 320°16'29".

**Richland** (Montana, Daniels County; Geodetic Survey of Canada, 1923).—In the southeast corner of NE¼ sec. 34, T. 37 N., R. 43 E., principal meridian.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office post at the southeast corner of the above section, 874.93 meters from the station in azimuth 341°13'58".

**Quantock** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—In SE¼ sec. 3, T. 3, R. 1 W., third meridian. The station is about 300 meters west of the east fence and approximately 500 meters south of a farmhouse.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the center of the east side of the above section, 301.84 meters from the station in azimuth 247°40'42".

**Templeman** (Montana, Daniels County; Geodetic Survey of Canada, 1923).—Near the middle of SW¼ sec. 30, T. 36 N., R. 45 E., principal meridian. The station is on the east edge of Horseshoe Basin on the road to Richland, about 100 yards east from the edge of the drop and about one-fourth mile west of a fence corner where the road from Opheim angles northwest into the basin.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office post at the center of the south side of the above section, 657.07 meters from the station in azimuth 309°10'27".

**Fife Lake** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—About 1 mile east and one-fourth mile south of the Johnson ranch house, in SE¼ sec. 27, T. 2, R. 29 W., second meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the northeast corner of sec. 22, T. 2, R. 29 W., 368.32 meters from the station, in azimuth 283°03'57".

**Poplar** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911; Geodetic Survey of Canada, 1923).—About  $1\frac{1}{2}$  miles north of International Boundary Monument 533, near the southwest corner of NW $\frac{1}{4}$  sec. 8, T. 1, R. 27 W., second meridian. The station is on the most northern high point of the ridge, a round knoll 200 meters west of a trail leading southward up a draw to a farmstead, which can be seen at the upper end.

Station mark: A bronze disk, marked "U. S. & C. B. SURVEY", set in a concrete pier. One reference mark is a cross cut in a granite rock, 8.645 meters from the station in azimuth 345°. A second reference mark is an arrow, cut in a granite rock set on edge, 8.5 meters from the station in azimuth 80°. In 1922 the Geodetic Survey of Canada recovered the station and established a new station of the same name 6.55 meters from the original station in azimuth 186°56'. The new station mark is a standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the center of the west side of the above section, 260.87 meters from the station in azimuth 66°43'11".

**Eddyside** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—About  $1\frac{1}{2}$  miles north and one-half mile west of Eddyside post office. In NE $\frac{1}{4}$  sec. 12, T. 2, R. 26 W., second meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the center of the north side of the above section, 138.03 meters from the station in azimuth 176°42'23".

**Madoc** (Montana, Daniels County; Geodetic Survey of Canada, 1923).—About 2 miles west of Madoc in NW $\frac{1}{4}$ , sec. 7, T. 35 N., R. 49 E., principal meridian, about 200 meters south and 300 meters west of the corner where the state road to Scobey is intersected by the road which runs to the south.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Whitetail** (Montana, Daniels County; Geodetic Survey of Canada, 1923).—Near the center of the west side of NE $\frac{1}{4}$  sec. 23, T. 37 N., R. 49 E., principal meridian, on the extreme eastern edge of a tableland and about 400 meters directly west of a school.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office post at the center of the north side of the above section, 354.84 meters from the station in azimuth 164°29'47".

**Flaxville** (Montana, Daniels County; Geodetic Survey of Canada, 1923).—In SW $\frac{1}{4}$ , sec. 24, T. 35 N., R. 50 E., principal meridian, about 75 meters west and 100 meters north of the southeast corner of this quarter section.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office post at the southeast corner of the above quarter section, 120.56 meters from the station in azimuth 341°35'25".

**Mervin** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911; Geodetic Survey of Canada, 1923).—About 1 mile west and 1 mile south of Paisley Brook post office, and about  $2\frac{1}{2}$  miles northeast of International Boundary Monument 550, in the SE $\frac{1}{4}$  sec. 17, T. 1, R. 23 W., second meridian. The station is on top of a round knob 70 meters north of the point where a trail goes over a ridge.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete block flush with the ground. In 1923 the Geodetic Survey of Canada recovered the station and established a new station of the same name 3.304 meters from the original station in azimuth 189°19'25". The new station mark is a standard Geodetic Survey of Canada station mark; see page 333. The Dominion Lands Survey post midway on the east line of sec. 17 is 642.26 meters from the Geodetic Survey of Canada station in azimuth 244°45'00".

**Ross** (Montana, Sheridan County; Geodetic Survey of Canada, 1923).—Near the north side of lot 2, sec. 5, T. 37 N., R. 53 E., principal meridian, in a farm yard about 30 meters south of a stable near a white house.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office stone post at the northeast corner of the above lot, 410.39 meters from the station in azimuth 237°19'33".

**Plentywood** (Montana, Sheridan County; Geodetic Survey of Canada, 1923).—About one-half mile north and 1 mile east of a white frame school, on the highest point of the butte in NE $\frac{1}{4}$  sec. 11, T. 34 N., R. 53 E., principal meridian.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office post at the center of the north side of the above section, 704.68 meters from the station in azimuth 123°35'31".

**Bruce** (Montana, Sheridan County; Geodetic Survey of Canada, 1923).—Most easily reached from Raymond, Montana. The station is in SW $\frac{1}{4}$  sec. 24, T. 37 N., R. 54 E., principal meridian.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is the southwest corner of the above section, 707.97 meters from the station in azimuth 32°13'37".

**Dooley** (Montana, Sheridan County; Geodetic Survey of Canada, 1923).—One mile south and one-fourth mile east of the town of Dooley. The station is in NW  $\frac{1}{4}$  sec. 22, T. 36 N., R. 56 E., principal meridian, at the center of the west side of this quarter section, on top of a hill 50 yards east of a grade road.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Tangedal** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—About 2 miles east and 4 miles north of Fairlawn post office, in the northeast corner of sec. 28, T. 1, R. 18 W., second meridian. The station is on top of a knoll about 125 meters west of the highest point on a road between secs. 27 and 28 where it turns to the east around the knoll.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the northeast corner of the above section, 96.95 meters from the station in azimuth  $235^{\circ}39'15''$ .

**Trees** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—About 3 miles south and 1 mile west of Burton post office in NE  $\frac{1}{4}$  sec. 26, T. 1, R. 16 W., second meridian, about 60 meters northwest of a stable.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the northeast corner of the above section, 345.03 meters from the station in azimuth  $255^{\circ}26'27''$ .

**Alkabo** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—About 140 meters south and 50 meters east of the center of the section in SE  $\frac{1}{4}$  sec. 11, T. 162 N., R. 102 W., fifth principal meridian.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Agate** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—About 18 miles south and 3 miles east of Tribune at a point 1 mile west of the Rangeview school. This school is 7 miles north and 3 miles west of the village of Fortuna, North Dakota. The station is in NW  $\frac{1}{4}$  sec. 8, T. 1, R. 14 W., second meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the center of the north side of the above section, 451.78 meters from the station in azimuth  $202^{\circ}26'32''$ .

**Norge** (North Dakota, Divide County; U. S. Coast and Geodetic Survey, 1912; Geodetic Survey of Canada, 1924).—About 22 meters south of a road on the highest part of a rounded ridge in the NW  $\frac{1}{4}$  NW  $\frac{1}{4}$  sec. 3, T. 162 N., R. 101 W., fifth principal meridian.

Station mark: A standard U. S. Coast and Geodetic survey bronze-disk station mark set in the top of a concrete cylinder 7 inches in diameter and 30 inches long incased in a galvanized-iron pipe which was used for the form. The cylinder projects 3 inches above the ground. The underground mark is a brass bolt one-fourth inch in diameter and 2 inches long set in a block of concrete 6 inches square on top and 4 inches thick. The bolt projects one-fourth inch above the concrete and is about 33 inches below the surface of the ground. One reference mark is a standard U. S. Coast and Geodetic Survey bronze-disk reference mark on the township road on the west slope of a hill, 87.10 meters from the station in azimuth  $173^{\circ}20'$ . A second reference mark is a fence post at the southeast corner of sec. 33, T. 163 N., R. 101 W., 337.00 meters from the station in azimuth  $107^{\circ}29'25''$ .

**Pole** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—On top of a hill, 5 miles north of Fortuna and three-fourths mile south of a school; in NW  $\frac{1}{4}$  sec. 11, T. 163 N., R. 101 W., fifth principal meridian.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a fence post at the northwest corner of the above section, 268.90 meters from the station in azimuth  $172^{\circ}31'18''$ .

**Messers** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—Near the northwest corner of SE  $\frac{1}{4}$  sec. 15, T. 1, R. 13 W., second meridian. The station is on a ridge about 100 meters north of a trail which is on the north side of a slough.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the Dominion Lands Survey post at the center of the north side of sec. 10, 382.51 meters from the station in azimuth  $5^{\circ}38'36''$ .

**Ambrose** (North Dakota, Divide County; U. S. Coast and Geodetic Survey, 1912).—In SE  $\frac{1}{4}$  sec. 27, T. 163 N., R. 99 W., fifth principal meridian. The station is about 175 meters southeast of a house.

Station mark: A standard U. S. Coast and Geodetic Survey bronze-disk station mark set in the top of a concrete cylinder 7 inches in diameter and 30 inches long incased in a galvanized-iron pipe. The cylinder projects 3 inches above the ground. The subsurface mark, 33 inches below the surface, is a brass bolt one-fourth inch in diameter and 2 inches long set in a block of concrete 6 inches square and 4 inches thick. The bolt projects a little above the concrete. The reference mark is a standard U. S. Coast and Geodetic Survey reference-mark disk about 2 meters from the southeast corner of the house, 173.43 meters from the station in azimuth  $150^{\circ}30'$ .

**Crosby** (North Dakota, Divide County; U. S. Coast and Geodetic Survey, 1912; Geodetic Survey of Canada, 1924).—About  $6\frac{1}{4}$  miles south and  $3\frac{1}{2}$  miles west of Ambrose in the NE  $\frac{1}{4}$  sec. 17, T. 162 N., R. 99 W., fifth principal meridian, on land belonging to C. J. Christiansen, who lives about 2 miles east.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark set in the top of a concrete cylinder 7 inches in diameter and 30 inches long incased in a galvanized-iron pipe which was used for a form. The cylinder projects 3 inches above the ground. There is no underground mark. A standard U. S. C. & G. S. bronze-disk reference mark set in a concrete cylinder in the same manner as the station mark is on the half-section line on the south slope of the knoll 137.46 meters distant (measured over the ground) in azimuth 349°59'. The chimney of a white schoolhouse a little more than one-half mile distant is in azimuth 209°47'.

**Ambrose Southwest Base** (North Dakota, Divide County; U. S. Coast and Geodetic Survey, 1912; Geodetic Survey of Canada, 1924).—About 3¼ miles south of International Boundary Monument 596; in the northwest corner of sec. 13, T. 163 N., R. 100 W., fifth principal meridian, about 60 meters south of an east-and-west road and 70 meters east of a north-and-south road.

**Station mark:** A standard U. S. C. & G. S. cap station mark, screwed to the top of a 3-inch iron pipe, which is embedded in a cylinder of concrete 10 inches in diameter and 30 inches long. The cylinder projects 3 inches above the ground. The underground mark is a brass bolt one-fourth inch in diameter and 2 inches long set in a block of concrete 6 inches square on top and 4 inches thick. The bolt projects a little above the concrete and is about 33 inches below the surface of the ground. A standard U. S. C. & G. S. bronze-disk reference mark set in the top of a concrete cylinder 5½ inches in diameter and 30 inches long incased in a galvanized-iron pipe which was used for the form, and projecting about 3 inches above the ground, is close to the property line at the south-east corner of the road crossing and is 79.58 meters from the station in azimuth 127°37'.

**Ambrose Northeast Base=School** (North Dakota, Divide County; C. H. Sinclair, 1911; U. S. Coast and Geodetic Survey, 1912; Geodetic Survey of Canada, 1924).—This is station "School" of the International Boundary Commission. It is about 2½ miles north of Ambrose, 0.7 mile southeast of International Boundary Monument 601; in the NW¼ sec. 36, T. 164 N., R. 99 W., fifth principal meridian, near the west boundary of the section. The station is in and east of the center of a public road which runs north from the west side of Ambrose. It is 0.1 mile north of a deep ravine and is on the highest knoll in the vicinity.

**Station mark:** A bench-mark post projecting 16 inches above the ground. The reference mark is a drill hole in the top of a stone post projecting 4 inches above the ground, 17.09 meters from the station in azimuth 352°28'. The east gable of a white house is 180 meters from the station in azimuth 99°01'.

**Bowie** (North Dakota, Divide County; C. H. Sinclair, 1911; U. S. Coast and Geodetic Survey, 1912; Geodetic Survey of Canada, 1924).—About 11½ miles west and 3 miles north of Ambrose, in the east half of fractional sec. 25, T. 164 N., R. 101 W., fifth principal meridian, on a knoll just south of the International Boundary.

**Station mark:** A bronze disk stamped "U. S. & C. B. SURVEY" in a concrete pier 12 by 12 by 19 inches set firmly in the ground and surmounted with a cairn. International Boundary Monument 592 is 90.70 meters from the station in azimuth 134°05'.

**Schnell** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—About 1 mile east of the blue twin bridges over Long Creek and a short distance south of a horseshoe bend in the creek, and on its east side. The station is in the northeast corner of NW¼ sec. 24, T. 1, R. 12 W., second meridian.

**Station mark:** A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the northeast corner of the above quarter section, 69.55 meters from the station in azimuth 213°28'45''.

**Hansen** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—In the southeast corner of SE¼ sec. 17, T. 163 N., R. 98 W., fifth principal meridian.

**Station mark:** A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office post at the southeast corner of the above section, 24.7 meters from the station in azimuth 279°08'55''.

**Gardner** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1924).—In NW¼ sec. 11, T. 2, R. 10 W., second meridian, on a knoll 270 meters east of the west side of the section and one-third mile south of its north limit. The station is across the road from, and almost due south of some farm buildings.

**Station mark:** A standard Geodetic Survey of Canada station mark; see page 333. The reference marks are Dominion Lands Survey posts, one at the northeast corner of sec. 10, T. 2, R. 10 W., 597.5 meters from the station in azimuth 153°03'02''; the second at the center of the east side of sec. 10, T. 2, R. 10 W., 384.7 meters from the station in azimuth 44°59'41''.

**Peterson** (North Dakota, Divide County; Geodetic Survey of Canada, 1924).—One mile north and two miles east of Crosby, nearly one mile due south of a house. The station is in SW¼ sec. 23, T. 163 N., R. 97 W., fifth principal meridian, and is about 90 meters east of the west side of sec. 23 and about 135 meters southeast of a stone pile.

**Station mark:** A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Estevan** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—About  $3\frac{1}{2}$  miles east of the town of Estevan, on the only prominent hill in the locality. The station is in SW $\frac{1}{4}$  sec. 17, T. 2, R. 7 W., second meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the center of the north side of sec. 8, T. 2, R. 7 W., 584.73 meters from the station in azimuth  $331^{\circ}52'21''$ .

**Cook** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—In NE $\frac{1}{4}$  sec. 29, T. 162 N., R. 94 W., fifth principal meridian, on high ground about 300 meters due east of a farmhouse.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a marked stone and mound at the center of the east side of sec. 29, 571.52 meters from the station in azimuth  $288^{\circ}56'02''$ .

**Dunbar** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—About 6 miles west and  $2\frac{1}{2}$  miles north of North Portal. The station is in NW $\frac{1}{4}$  sec. 18, T. 1, R. 5 W., second meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post, at the center of the east side of sec. 13, T. 1, R. 6 W., 804.38 meters from the station in azimuth  $55^{\circ}08'48''$ .

**Short Creek** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—On the east side of a road, 1 mile east and 5 miles north of Columbus, in the southeast corner of NW $\frac{1}{4}$  sec. 4, T. 163 N., R. 93 W., fifth principal meridian. The station is one-half mile north of a house and about 135 meters south of Short Creek.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is the center of the west side of the above section, 465.89 meters from the station in azimuth  $75^{\circ}07'46''$ .

**Lignite** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—In NE $\frac{1}{4}$  sec. 12, T. 162 N., R. 92 W., fifth principal meridian, on a knoll about one-third mile east of the village of Lignite and about 135 meters north of the Great Northern Railway tracks. There is a farmhouse across the road to the north and about 100 meters to the west.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a marked stone in the center of the road 10 inches below grade, which marks the center of the east side of the above section. This stone is 506.25 meters from the station in azimuth  $343^{\circ}29'25''$ .

**Spy** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—On a very prominent knoll known locally as Scout Hill about 2 miles northwest of the village of Northgate, North Dakota, in NW $\frac{1}{4}$  sec. 12, T. 1, R. 3 W., second meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference marks are Dominion Lands Survey posts, one at the northeast corner of sec. 12, T. 1, R. 3 W., 1,300.8 meters from the station in azimuth  $248^{\circ}13'59''$ ; the second at the center of the east side of the same section, 1,250.26 meters from the station in azimuth  $284^{\circ}55'48''$ .

**Portal** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—On or near the International Boundary between North Portal, Saskatchewan, and Portal, North Dakota. The station is on the road allowance south of SE $\frac{1}{4}$  sec. 1, T. 1, R. 5 W., second meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the center of the south side of the above section, 339.26 meters from the station in azimuth  $95^{\circ}01'43''$ .

**Flaxton** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—About one-half mile north and  $2\frac{1}{2}$  miles east of Flaxton. The station is in the southwest corner of NW $\frac{1}{4}$  sec. 35, T. 163 N., R. 90 W., fifth principal meridian, about one-third mile south and one-fourth mile east of a house.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is the center of the east side of sec. 34, T. 163 N., R. 90 W., 108.75 meters from the station in azimuth  $47^{\circ}25'51''$ .

**McGillivray** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—In SW $\frac{1}{4}$  sec. 25, T. 163 N., R. 88 W., fifth principal meridian, near the south boundary of the section, about 300 meters due west of a house.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is the corner mark at the center of the south side of the above section, 286.40 meters from the station in azimuth  $281^{\circ}38'06''$ .

**Martin** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—In NE $\frac{1}{4}$  sec. 16, T. 1, R. 1 W., second meridian, about one-fourth mile north of a house.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the corner mark at the center of the north side of the above section, 568.65 meters from the station in azimuth  $150^{\circ}15'02''$ .

**Bluel** (North Dakota, Renville County; Geodetic Survey of Canada, 1924).—In SW¼ sec. 20, T. 163 N., R. 86 W., fifth principal meridian. The station is about 50 meters northwest of a house.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is the corner mark at the center of the west side of the above section, 851.80 meters from the station in azimuth 141°04'58".

**Goertz** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—In SE¼ sec. 28, T. 1, R. 33 W., principal meridian. The station is just west of the middle of the east side of the above section, on the edge of a pothole in the prairie.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the corner mark at the center of the east side of the above section, 105.07 meters from the station in azimuth 234°51'47".

**Harris** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—In NW¼ sec. 19, T. 1, R. 31 W., principal meridian, about 30 meters east of the west boundary of the section and about 340 meters south of the north boundary of the section. The station is about 50 meters southwest of a barn and 18 meters south of a granary.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Trout** (North Dakota, Renville County; Geodetic Survey of Canada, 1924).—In SW¼ sec. 1, T. 162 N., R. 85 W., fifth principal meridian, on high ground about 450 meters southeast of a house, and 18 meters south of a ridge of drifted soil.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is the corner mark at the center of the west side of the above section, 391.482 meters from the station in azimuth 94°15'16".

**Gainsborough** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—About 9 miles south and 2 miles east of the village of Gainsborough. The station is in SE¼ sec. 22, T. 1, R. 30 W., principal meridian, on high ground about one-half mile southeast of a house.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the northeast corner mark of sec. 15, T. 1, R. 30 W., 173.70 meters from the station in azimuth 308°26'24".

**Mohall** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1924).—In NW¼ sec. 2, T. 162 N., R. 83 W., fifth principal meridian. The station is on high ground about one-third mile due north of a house.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is the northwest corner mark of the above section, 214.802 meters from the station in azimuth 127°51'32".

**Lyleton** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—In SW¼ sec. 28, T. 1, R. 28 W., principal meridian, about 400 meters due north of Lyleton railway station. The triangulation station is about 30 meters north and 15 meters east of a deserted house and about 100 meters due east of a red barn.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the corner mark at the center of the east side of the above section, 1,268.15 meters from the station in azimuth 246°24'44".

**Westhope** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—In NE¼ sec. 35, T. 163 N., R. 81 W., fifth principal meridian, about 20 meters west of the east side of the section and about one-half mile east of a house.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is the corner mark at the center of the east side of the above section, 522.06 meters from the station in azimuth 357°38'52".

**Hayden** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—In SE¼ sec. 25, T. 1, R. 27 W., principal meridian. The station is near the center of the section and about 135 meters east of a large stone pile.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the corner mark at the center of the east side of sec. 26, T. 1, R. 27 W., 993.78 meters from the station in azimuth 91°12'06".

**Malme** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—In NW¼ sec. 22, T. 163 N., R. 79 W., fifth principal meridian. The station is about 22 meters east of the west side of the section and about 315 meters south of a house.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is the northwest corner of the above section, 384.07 meters from the station in azimuth 175°45'21".

**Souris** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—About 1½ miles north and 3 miles west of the village of Souris, in SE¼ sec. 10, T. 163 N., R. 78 W., fifth principal meridian, near the center and 18 meters north of the south boundary of the section. The station is about 90 meters southwest of a house.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Temple** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—About 2 miles east and 1 mile south of the town of Waskada in SE¼ sec. 34, T. 1, R. 25 W., principal meridian. The station is 180 meters due west of some small deserted buildings across the road in section 35 and about one-fourth mile southeast of a large square deserted house with a cottage roof.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Johnson** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1922).—On the second high ridge of the Turtle Mountains as approached from the west, about one-third mile north of a deserted house. The station is accessible by motor from Souris, by first traveling west, then southeast, and then nearly due north along a rock-strewn trail for 5 or 6 miles. The station is in SE¼ sec. 34, T. 164 N., R. 76 W., fifth principal meridian, near the east side of the section.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Declercq** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—About 5 miles east and 1½ miles south of Goodlands in SW¼ sec. 33, T. 1, R. 23 W., principal meridian. The station is just west of the half-mile section line and is about 90 meters south of a road from Goodlands.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Scott** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—In the Turtle Mountain Forest Reserve close to the road leading from the main cabin to the west cabin of the reserve. The station is in NW¼ sec. 27, T. 1, R. 21 W., principal meridian. Information regarding its location and the road to it may be found by inquiring at Boissevain, Manitoba.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Summit** (Manitoba, Souris District; J. J. McArthur, 1910; Geodetic Survey of Canada, 1925).—On the highest point in the Turtle Mountains in SE¼ sec. 1, T. 1, R. 23 W., principal meridian, about 3½ meters north of International Boundary Monument 699. In dry weather the station can be reached with a light car from Bottineau, North Dakota, via the Lake Metigoshe road.

Station mark: A standard Geodetic Survey of Canada station mark, see page 333, replacing the original mark of the International Boundary Commission.

**Olie** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—In sec. 2, T. 163 N., R. 74 W., fifth principal meridian; on a hill about 270 meters northwest of a house.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Dunseith** (North Dakota, Rolette County; Geodetic Survey of Canada, 1925).—In SW¼ sec. 21, T. 163 N., R. 72 W., fifth principal meridian. The station is about 1½ miles east and one-fourth mile north of a prominent wooded hill and about one-fourth mile due east of a group of small deserted farm buildings in a small wood.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Ninga H** (Manitoba, Souris District; J. G. Hefty, 1918; Geodetic Survey of Canada, 1925).—In the east end of the Turtle Mountain Forest Reserve, about 1 mile south of Lake William; on the summit of a very prominent knoll known as the Turtle's Back; in SE¼ sec. 18, T. 1, R. 19 W., principal meridian. This station was originally established in 1918 to replace station "Ninga" of 1911 which had been destroyed.

Station mark: In 1918 the station was marked by a wooden hub. In 1919 the wooden hub was replaced by a cross cut in a rock 6 by 6 by 6 inches placed 20 inches underground, and a surface mark, consisting of a bronze disk inscribed "U. S. & C. B. SURVEY" set in a granite boulder 20 by 20 by 20 inches, was set flush with the ground. In 1925 the Geodetic Survey of Canada established a first-order station, calling it "Ninga H", within a few feet of the station of 1918 and marked it with a standard Geodetic Survey of Canada station mark; see page 333. No connection between the two stations was recorded.

**Ram** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—About three-fourths mile east and 1 mile south of the town of Ninga, in SE¼ sec. 8, T. 3, R. 18 W., principal meridian. The station is about 180 meters north of the Little Pembina River.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the center of the east side of the above section, 310.49 meters from the station in azimuth 244°26'53".

**St. John** (North Dakota, Rolette County; Geodetic Survey of Canada, 1925).—Near the center of the north boundary of SW¼ sec. 29, T. 163 N., R. 70 W., fifth principal meridian. The station is on top of a hill near some deserted farm buildings, about one-fourth mile west of a road.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Lena** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—About 3 miles due south of the town of Lena in SE¼ sec. 10, T. 1, R. 17 W., principal meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the center of the east side of the above section, 523.7 meters from the station in azimuth  $265^{\circ}58'37''$ .

**Killarney** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—About 1 mile southwest of the town of Killarney, on a high ridge just south of the lake. This ridge is heavily wooded on the north side and slopes off to a rocky meadow on the south. The station is in NW $\frac{1}{4}$  sec. 34, T. 2, R. 17 W., principal meridian, about one-fourth mile west of a farmhouse.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Margaret Northwest Base** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—In SE $\frac{1}{4}$  sec. 6, T. 5, R. 18 W., principal meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the center of the north side of sec. 31, T. 4, R. 18 W., about 200 meters from the station in azimuth  $10^{\circ}50'05''$ .

**Fairhall Southeast Base** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—In SE $\frac{1}{4}$  sec. 11, T. 4, R. 17 W., principal meridian, about 140 meters west of the eastern boundary of the section, on a prominent hill which is apparently the highest point in the neighborhood.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Mowbray** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—In SE $\frac{1}{4}$  sec. 32, T. 2, R. 14 W., principal meridian. The station mark should be visible from the southwest corner of the quarter section.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the northeast corner of sec. 29, T. 2, R. 14 W., 544.435 meters from the station in azimuth  $297^{\circ}10'25''$ .

**Holmfild** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—One mile due south of the town of Holmfild, in the extreme southeast corner of SE $\frac{1}{4}$  sec. 13, T. 2, R. 16 W., principal meridian, and about 70 meters north of Stinking Lake. There are three prominent hills to the south.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the northeast corner of sec. 12, T. 2, R. 16 W., 83.92 meters from the station in azimuth  $286^{\circ}45'55''$ .

**Taylor** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—In SE $\frac{1}{4}$  sec. 7, T. 1, R. 14 W., principal meridian; about 180 meters west of a house.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Clearwater** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—In NW $\frac{1}{4}$  sec. 22, T. 2, R. 13 W., principal meridian; on a very prominent knoll which is the highest point in the vicinity.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Sarles** (North Dakota, Towner County; Geodetic Survey of Canada, 1925).—Near the center of sec. 4, T. 163 N., R. 65 W., fifth principal meridian; about one-third mile due south of Dash schoolhouse and 9 meters south of an old stone ruin.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Fallison** (North Dakota, Cavalier County; Geodetic Survey of Canada, 1925).—In SE $\frac{1}{4}$  sec. 2, T. 163 N., R. 64 W., fifth principal meridian.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333. The reference mark is a General Land Office post at the southeast corner of the above section, 407.35 meters from the station in azimuth  $350^{\circ}55'33''$ .

**Pilot Mound** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—On a prominent knoll known as Pilot Mound, 1 mile northwest of the town of Pilot Mound. The station is in SE $\frac{1}{4}$  sec. 20, T. 3, R. 11 W., principal meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the northwest corner of sec. 16, T. 3, R. 11 W., about 539 meters from the station in azimuth about  $310^{\circ}32'$ .

**Star Mound** (Manitoba, Lisgar District; J. G. Hefty, 1919; Geodetic Survey of Canada, 1925).—About 4 miles west and 1 mile north of the town of Snowflake, on the summit of Star Mound—the most prominent hill in the locality, in SE $\frac{1}{4}$  sec. 27, T. 1, R. 10 W., principal meridian, and near the south line of the section. The summit of the mound is an ancient burial ground.

Station mark: A bronze disk set in an irregular granite boulder of about 200 pounds weight set with its top about 4 inches above the surface of the ground. The subsurface mark is a cross cut in a stone 12 by 12 by 8 inches placed 30 inches underground. A cross cut on a large flat boulder 30 inches wide, flush with the ground, is 30.4 meters southeast of the station and directly in line with a windmill about one-fourth mile distant. In



1925 the Geodetic Survey of Canada recovered the station and established a first-order station under the same name 39.9 meters from the original station in azimuth  $256^{\circ}57'28''$ . The new station is marked by a standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the Dominion Lands Survey post at the center of the north line of sec. 22, T. 1, R. 10 W., 306.58 meters from the station in azimuth  $79^{\circ}35'30''$ .

**Manitou** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—About  $1\frac{1}{4}$  miles west and  $1\frac{1}{2}$  miles north of the town of Manitou, in the northwest corner of SE $\frac{1}{4}$  sec. 36, T. 3, R. 9 W., principal meridian. The station is about 275 meters due west of a cemetery.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Maida** (North Dakota, Cavalier County; Geodetic Survey of Canada, 1925).—About 2 miles west and 2 miles south of Maida, in NW $\frac{1}{4}$  sec. 2, T. 163 N., R. 60 W., fifth principal meridian; on a very prominent knoll.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Cavers** (North Dakota, Cavalier County; Geodetic Survey of Canada, 1925).—About 4 miles east and one-half mile south of the town of Hannah. The station is in sec. 12, T. 163 N., R. 62 W., fifth principal meridian, and about 30 meters east of a barn.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Kaleida** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—About three-fourths mile west and three-fourths mile south of the town of Kaleida. The station is in SW $\frac{1}{4}$  sec. 16, T. 2, R. 8 W., principal meridian. It is about 375 meters east of the southwest corner and just inside the south boundary of the section.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Darlingford** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—In SW $\frac{1}{4}$  sec. 29, T. 3, R. 7 W., principal meridian. The station is about 135 meters north of the south boundary of the section.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the northeast corner of sec. 19, T. 3, R. 7 W., 332.54 meters from the station in azimuth  $53^{\circ}08'10''$ .

**Numedahl** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—In SW $\frac{1}{4}$  sec. 7, T. 1, R. 5 W., principal meridian. The station is on a knoll about 180 meters northwest of a farmhouse.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**North Star** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—In SW $\frac{1}{4}$  sec. 5, T. 2, R. 6 W., principal meridian. The station is on a small scrub-covered knoll about 25 meters west of the east boundary of the quarter section and 180 meters north of its southern boundary.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Morden** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—Beside the power line from Winnipeg and 4 miles due east of the town of Morden. The station is in SW $\frac{1}{4}$  sec. 12, T. 3, R. 5 W., principal meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. One reference mark is an astronomic pier about 3 meters west of the station. A second reference mark is a Dominion Lands Survey post at the northeast corner of sec. 2, T. 3, R. 5 W., 392.736 meters from the station in azimuth  $83^{\circ}51'25''$ .

**Plum Coulee** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—In NE $\frac{1}{4}$  sec. 23, T. 2, R. 3 W., principal meridian; about 45 meters north-northwest of a farm house.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a reestablished Dominion Lands Survey post at the center of the east side of the above section. This reference mark as reestablished is probably within 3 feet of its correct position. It is 161.96 meters from the station in azimuth  $303^{\circ}54'59''$ .

**Walhalla** (North Dakota, Pembina County; Geodetic Survey of Canada, 1925).—On the summit of a heavily wooded ridge about 1 mile southeast of the town of Walhalla, in NE $\frac{1}{4}$  sec. 33, T. 163 N., R. 56 W., fifth principal meridian. The station may be reached by following a road from Walhalla which leads east along the railway tracks. This road forks twice and in each case the right fork should be followed. After passing the second fork there is a long hill to climb. The station is about 70 meters southeast of the point where the road reaches the top of the hill.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Neche** (North Dakota, Pembina County; Geodetic Survey of Canada, 1925).—In NE $\frac{1}{4}$  sec. 31, T. 164 N., R. 53 W., fifth principal meridian; in a wooded pasture lot about 270 meters north and one-half mile east of the town of Neche, and about 15 meters south of the north boundary of the section.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Altona** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—One mile north and two miles east of the town of Altona. The station is in the southeast corner of SE¼ sec. 15, T. 2, R. 1 W., principal meridian. There is one farmhouse 70 meters north and a second 90 meters south of the station.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a fence post at the northeast corner of sec. 10, T. 2, R. 1 W., 128.6 meters from the station in azimuth 292°36'37".

**Pembina** (North Dakota, Pembina County; Geodetic Survey of Canada, 1925).—In the southwest corner of SW¼ sec. 6, T. 163 N., R. 51 W., fifth principal meridian; 2 miles due west of the town of Pembina. The station is in a small pasture field about 180 meters west of some farm buildings.

Station mark: A standard U. S. Coast and Geodetic Survey station mark; see page 333.

**Letellier** (Manitoba, Provencher District; Geodetic Survey of Canada, 1925).—In the southwest corner of River Lot 121, of the old Red River Survey. Sec. 17, T. 2, R. 2 E., principal meridian, is just west of this lot.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the southwest corner of the above lot, 150.82 meters from the station in azimuth 87°28'35".

**Ridgeville** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 59.6 from South Junction, opposite the point of tangency of the first curve west of Tolstoi station, 19.79 meters north of the south rail.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**States** (Manitoba, Provencher District; Minnesota, Kittson County; U. S. Coast and Geodetic Survey, 1907; Geodetic Survey of Canada, 1923).—On the International Boundary just east of Monument 837, 4¼ miles east of Red River. The station is only a few feet east of the west side of sec. 27, T. 164 N., R. 50 W., fifth principal meridian.

Station mark: The point of a sixtypenny wire nail set in a concrete-filled iron pipe, 2 inches in diameter and 2 feet long, set in concrete. A like mark is placed underneath. A 6-inch layer of sand separates the surface and subsurface marks. There are two reference marks: the first is International Boundary Monument 837, 109.68 meters from the station in azimuth 90°12'04"; the second is a sixtypenny wire nail set in a concrete-filled iron pipe, 2 inches in diameter and 2 feet long set in concrete, 21.871 meters from the station in azimuth 270°00'51".

**Humboldt** (Minnesota, Kittson County; Geodetic Survey of Canada, 1923; U. S. Coast and Geodetic Survey, 1935).—Close to the site of former U. S. C. & G. S. station "Hill", which was destroyed and is now superseded by "Humboldt." The station is 5 miles west of Northcote, on the Great Northern Railway, in the southwest corner of SE¼ sec. 15, T. 162 N., R. 50 W., fifth principal meridian. It is in Hill township, on land belonging to Henry Nolte, one-half mile southwest of his house.

Station mark: A standard U. S. C. & G. S. station mark, the surface mark of which projects about 24 inches above ground.

**Canada** (Manitoba, Provencher District; Minnesota, Kittson County; U. S. Coast and Geodetic Survey, 1907; Geodetic Survey of Canada, 1923; 1935).—On the International Boundary just west of Monument 848, 15 miles east of Red River. The station is a few feet west of the east side of sec. 29, T. 164 N., R. 48 W., principal meridian.

Station mark: The point of a sixtypenny wire nail set in a concrete-filled terra-cotta pipe 18 inches long set in concrete. A like mark is placed underneath. A 6-inch layer of sand separates the surface and subsurface marks. There are two reference marks: the first is International Boundary Monument 848, 25.28 meters from the station in azimuth 270°03'21"; the second is a sixtypenny wire nail set in a concrete-filled terra-cotta pipe, 2 feet long, set in concrete, 22.065 meters from the station in azimuth 90°15'18".

**Tolstoi** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 51.7 from South Junction, 46.54 meters east of the center of Tolstoi railway station and 5.37 meters south of the south rail.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Stuartburn** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 47.38 from South Junction, at the point of intersection of the tangents of the first curve west of Stuartburn station, 2,112.88 meters west of the center of Stuartburn railway station.

Station mark: A nail in a wooden post.

**Vita** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 41.8 from South Junction, at the point of intersection of the tangents of the first curve west of Vita railway station and 5,000 meters west of the center of the telegraph office at Vita station.

Station mark: A nail in a wooden post.

**Read** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 37.65 from South Junction, 1,692.6 meters east of the center of the telegraph office at Vita station and 5.44 meters south of the north rail.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Ingram** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 35.51 from South Junction, 5,569.6 meters west of the center of Caliento station, and 4.29 meters south of the north rail.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Caliento** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 32.96 from South Junction, 338.7 meters east of Caliento station and 9.903 meters north of the north rail.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Menisino** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 18.5 from South Junction, 272.6 meters west of the center of Menisino station, and 1.99 meters south of the south rail.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Piney** (Manitoba, Provencher District; C. H. Sinclair, 1912; Geodetic Survey of Canada, 1924).—On the most southern projection of a high ridge about 2 miles east of Menisino, overlooking lowlands to the east, south and west; about one-fourth mile north of the Canadian National Railway and 11.3 meters north of the center of the old ridge road.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Fast** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 13.4 from South Junction, 2.6 miles west of Piney station, 188.5 meters west of the beginning of the first curve west of Piney station, on the line of tangent produced.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**McQuade** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway in the Piney yards at mileage 10.94 from South Junction, 148.68 meters west of the center of the telegraph office at Piney station and 3.396 meters south of the north rail.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Slow** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 7.4 from South Junction, 149.5 meters west of the beginning of the curve at the end of the Guilbault-Slow tangent.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Guilbault** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—North of the right-of-way of the Canadian National Railway at mileage 5.3 from South Junction, in line with the tangent of the south rail, 2,537 meters west of the beginning of the first curve west of South Junction and 877 meters west of the north-east corner of sec. 14, T. 1, R. 12 E., principal meridian.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**South Junction** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 63.5 from Rainy River, between the tracks of the Winnipeg-Fort Frances line and the branch line to Emerson; 106.77 meters northwest of the point of junction switch and 7.37 meters southwest of the northeast rail of the main line.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Swamp** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—South of the right-of-way of the Canadian National Railway, at mileage 62.2 from Rainy River; at the point of intersection of the tangents of the first curve southeast of South Junction; south of the rails, 350 meters southeast of the beginning of the curve.

Station mark: A nail in a wooden post.

**Tod** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—South of the right-of-way of the Canadian National Railway, at mileage 60.35 from Rainy River; at the point of intersection of the lines "Tod-Soft" and "Tod-Swamp"; on the second curve southeast of South Junction, 150 meters from the beginning of the curve of the northeast rail.

Station mark: A nail in a wooden post.

**Soft** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—North of the right-of-way of the Canadian National Railway, at mileage 59.8 from Rainy River; at the point of intersection of the tangents

of the second curve northwest of Sprague station, 250 meters northwest of the beginning of the curve of the south rail.

Station mark: A nail in a wooden post.

**Sprague** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway at mileage 58.1 from Rainy River, one-half mile northwest of Sprague station; 126.05 meters northwest of mile post 58 and 150 meters northwest of the beginning of the first curve northwest of Sprague station, on the line of the north rail produced.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Rita** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway, at mileage 54.6 from Rainy River; about 3 miles southeast of Sprague station, 960.1 meters northwest of mile post 54, and 9.907 meters northeast of the northeast rail.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Middleboro** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—On the right-of-way of the Canadian National Railway, at mileage 48.4 from Rainy River; just southeast of Middlebro station and 9.45 meters southwest of the northeast rail.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333.

**Muskeg** (Manitoba, Provencher District; Geodetic Survey of Canada, 1924).—Northeast of the right-of-way of the Canadian National Railway,  $1\frac{1}{4}$  miles from the point where the railway crosses the International Boundary; at the point of intersection of the tangents of the first curve northwest of that point, and 450 meters northwest of the beginning of the curve.

Station mark: A nail in a wooden post.

**Warroad North Base=Boundary Monument 909** (Manitoba, Provencher District; Minnesota, Roseau County; C. H. Sinclair, 1912; Geodetic Survey of Canada, 1924).—On the International Boundary at the crossing of the Canadian National Railway about 4 miles west of where the boundary intersects Lake of the Woods. The station is on the east side of the railroad track.

Station mark: A 5-foot cast-iron post set in a concrete base. The mark is in unstable soil and was found out of plumb in 1915. It was straightened up but was again found out of plumb in 1917. It was straightened up once more and additional concrete placed around the base, making the base 5 feet square and  $2\frac{1}{2}$  feet deep, resting on clay bottom. The subsurface mark is a  $\frac{3}{4}$ -inch bolt set in concrete, 4 inches below the bottom of the base. An 85-foot tower was built over the station, its seven legs being set in concrete foundations 3 feet deep.

**Warroad South Base** (Minnesota, Roseau County; C. H. Sinclair 1912; U. S. Coast and Geodetic Survey, 1923).—About 1 mile north of Warroad, Minnesota, on the east side of the Canadian National Railway, 700 meters north of the Great Northern Railway crossing. The station is 14.575 meters east, at right angles, from the east rail of the track.

Station mark: A bronze disk marked "U. S. & C. B. S.", set in a block of concrete 2 feet square and  $2\frac{1}{2}$  feet deep, with the top a little above the surface of the ground. The subsurface mark is a bronze disk set in concrete  $2\frac{1}{2}$  feet underground; under this is another concrete block with a cross in its top surface. A cross cut in the top of a concrete post 8 by 8 by 18 inches, set flush with the ground, is 26.622 meters west of the station. Another like mark is 3.885 meters west of the station. Both reference marks are inside the railway right-of-way fences, one on either side of the track. A 55-foot tower was used at this station.

**Thunder** (Manitoba, Provencher District; Jesse Hill, 1917; U. S. Coast and Geodetic Survey, 1923).—On the west side of Lake of the Woods, about 1,300 meters northwest of Buffalo Point and about 1,100 meters north of the International Boundary line. The station is on a sandy ridge about 10 meters above the lake level. It may be reached by a trail from the Indian houses on Buffalo Point.

Station mark: A bronze disk set in concrete. A 65-foot tower was built over the station for observing.

**West Willow** (Minnesota, Roseau County; Jesse Hill, 1917).—On the south shore of Lake of the Woods, about  $1\frac{1}{4}$  miles west of the mouth of Willow Creek and in the eastern part of fractional sec. 33, T. 163 N., R. 35 W., fifth principal meridian. The station is on a sand bar at the lake shore and is backed by a swamp which extends a half mile inland.

Station mark: A bronze disk set in a concrete block 2 feet square and 3 feet deep. A 35-foot tower was used for observing, and the legs of the tower were set in concrete.

**Stoney** (Minnesota, Lake of the Woods County; C. H. Sinclair, 1913; 1917).—On the north side of Lake of the Woods, on Stony Point. The station is about 300 meters southeast of the shore of Sand Point Bay, which lies south of the mouth of Stony Creek. It is in the southwest corner of sec. 35, T. 166 N., R. 35 W., fifth principal meridian. It is on the first rise of ground from the muskeg as approached from the south or west.

Station mark: A bronze disk marked "U. S. & C. B. S." set in a concrete block flush with the ground. A 75-foot tower was used for observing.

## GEORGIA STRAIT TO LAKE OF THE WOODS, POINTS SUPPLEMENTARY TO FIRST-ORDER SCHEME

**Lake View** (British Columbia, Yale District; E. C. Barnard, 1904; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1935).—On a high, bare mountain summit about 3 miles north of the International Boundary, about 3½ miles northeast of Cathedral Peak. The east fork of the Ashnola River heads to the south of this mountain and runs around the east base of it.

Station mark: An aluminum station-mark disk marked "U. S. & C. B.", set in solid rock, with a cairn built over it.

**Snowy** (British Columbia, Yale District; E. C. Barnard, 1904; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1935).—On the highest point of a bold, high mountain on the north side of the headwaters of Snehumpton Creek, a small stream that empties into the Similkameen River a short distance north of the International Boundary. It is on the same ridge and about 6 miles northeast of Horseshoe Pass.

Station mark: An aluminum disk marked "U. S. & C. B.", set in solid rock, over which is a cairn.

**Goat Peak Lookout** (Washington, Okanogan County; U. S. Coast and Geodetic Survey, 1925).—On the summit of Goat Peak about 15 miles northwest of Winthrop, and about 3 miles north of Mazama. It is reached by road from Winthrop, thence 12 miles to Mazama, and thence following Forest Service trail and telephone line up the ridge to the peak. There is a standard Region-6 U. S. Forest Service lookout house with a peaked cupola on the summit of the peak. The station was not occupied.

Station mark: Peak of the cupola. No other station mark was set in 1925 but the Forest Service states it intends to set a Coast and Geodetic Survey standard bronze-disk station mark in the ledge rock under the center of the cupola and under the floor of the house.

**Tower Mountain** (Washington, Okanogan County; U. S. Coast and Geodetic Survey, 1925).—On the main summit of the Cascade Range between the heads of Early Winters Creek and the West Fork of Methow River, and near the summit of Tower Mountain. The mountain is difficult to scale and was covered with snow in June 1925, when the station was marked. The summit could not be reached at that time. The station was not occupied.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark, set in a drill hole in solid rock, over which a cairn 3 feet in diameter and 5 feet high was built. The station mark is on a point of the ridge about 185 meters southeast of and at an elevation of about 90 meters below the highest point.

**North Twenty Mile Lookout** (Washington, Okanogan County; U. S. Coast and Geodetic Survey, 1925).—On the summit of North Twenty Mile Peak about 20 miles northeast of Winthrop, Washington. It may be reached from Winthrop by road 18 miles up the Chewack River, thence following the Forest Service trail and telephone line up Twenty Mile Creek to the station. A standard Region-6 U. S. Forest Service lookout house with peaked cupola stands on the summit of the peak. The station was not occupied.

Station mark: The apex of the cupola of the lookout house. No Coast and Geodetic Survey bronze-disk station mark was set at the time but the Forest Service states that one will be set in the ledge under the floor of the house, directly under the center of the cupola. A bronze disk of the U. S. Forest Service, lettered "U. S. Forest Service, Department of Agriculture", was set in a boulder about 6 feet long by 3 feet high, in azimuth 191°46', 49.49 meters from the center of the cupola as projected to the ground.

**Muckamuck Lookout** (Washington, Okanogan County; U. S. Coast and Geodetic Survey, 1925).—On the summit of Muckamuck Mountain, about 6 miles northwest of Conconully, Washington. The station may be reached from Conconully by road and Forest Service trail. On the summit of the mountain is a standard Region 6 U. S. Forest Service lookout house with peaked cupola. The station was not occupied.

Station mark: Peak of the cupola of the lookout house. A standard U. S. C. & G. S. bronze-disk station mark set in the floor of the lookout house directly under the center of the cupola.

**Bonaparte** (Washington, Okanogan County; U. S. Geological Survey, 1889; U. S. Coast and Geodetic Survey, 1925).—On the conspicuous mountain by that name. The station is on the highest point at an approximate elevation of 7,280 feet. A Forest Service lookout observatory, a frame building, 14 by 14 feet, elevated 16 feet above the ground, stands near the station.

Station mark: U. S. G. S. copper-disk station mark set in rock. The center of the old tower is 7.16 meters from the station in azimuth 45°38'.

**White** (Washington, Ferry County; C. H. Sinclair, 1904; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1930).—On the summit of White Mountain, about 4 miles southeast of Midway, British Columbia, and one mile south of the International Boundary.

Station mark: The original station mark was a drill hole in outcropping bedrock. In 1925 a standard U. S. C. & G. S. bronze-disk station mark was set in the drill hole.

**Paris** (British Columbia, Yale District; C. H. Sinclair, 1904; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1930).—On the summit of a bare knoll on the highest part of a high, timbered

ridge, to the east of the road and about midway between No. 4 Mine and Paris Mine. The station is about 7 miles east of Midway, British Columbia, and about 8 miles west of Grand Forks, British Columbia.

Station mark: An aluminum-disk station mark stamped "U. S. & C. B." set in the outcropping bedrock on the highest point of the knoll. A Canadian mineral-survey station is about 2 meters south of the station.

**Copper Butte** (Washington, Ferry County; U. S. Coast and Geodetic Survey, 1925).—On the summit of Copper Butte, in the Colville National Forest, about 10 miles by road and 6 miles by trail northeast of Republic, Washington. The U. S. Forest Service has a lookout house 12 by 12 feet square, surmounted by a cupola 6 feet square on the summit of the peak. The station was not occupied.

Station mark: The apex of the cupola. The station is further marked by a U. S. C. & G. S. standard bronze-disk station mark set in a block of concrete flush with the ground, from which the northeast corner of the lookout house bears south  $3^{\circ}$  west, 4.17 meters distant; the northwest corner of the lookout house bears south  $43^{\circ}$  west, 5.87 meters distant; the middle turnbuckle of the northwest guy wire bears south  $66^{\circ}$  west, 6.34 meters distant; and the northeast lightning wire, where it enters the ground, bears north  $47^{\circ}$  east, 22.53 meters distant.

**Lake** (British Columbia, Kootenay West District; Howell Bigger, 1905; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1934).—On the summit of Lake Mountain, about 3 miles south-by-west of Trail, British Columbia, and about  $1\frac{1}{2}$  miles west of Violin Lake which can be seen from the summit of the mountain.

Station mark: In 1925 the U. S. Coast and Geodetic Survey found a cairn marking the old station and drove an iron pin in the center of it. They then set a standard Geodetic Survey of Canada bronze-disk station mark in the outcropping bed rock 3.215 meters from the original station mark in azimuth  $57^{\circ}49'$ . In 1930 the original station mark could not be found, but the bronze disk was recovered. The published position is that of the bronze disk.

**Beaver** (British Columbia, Kootenay West District; U. S. Coast and Geodetic Survey, 1925; International Boundary Commission, 1934).—On the south end of the range of mountains lying north of the International Boundary and east of the Columbia River and known as the Gold Range. It is on a bare summit at the extreme south end of the ridge. The station is not on Beaver Mountain, but is about 5 miles southeast of it. It is about 2 miles south of station "Kelly" on the same ridge.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark set in the rock outcrop. There are no references. International Boundary Commission station "Beaver, 1905", which was within a few feet of this station has been lost and no mark of it remains.

**Creston** (British Columbia, Kootenay East District; U. S. Coast and Geodetic Survey, 1925).—At Creston, British Columbia, about 275 meters west of the Canadian Pacific Railway station, 12 meters south of the center line of Fourth Street, 1.2 meters west of the A. E. French building, and opposite the Creston Hotel.

Station mark: A standard Geodetic Survey of Canada bronze-disk station mark set in a square block of concrete. The subsurface mark is a like bronze disk set in a square block of concrete 3 feet underground. The reference mark is an International Boundary Commission bench mark, a standard iron pipe with a bronze cap, marked "United States Bench Mark" set near the steps of the Creston Hotel, 21.289 meters from the station in azimuth  $170^{\circ}20'19''$ .

**Gateway South Base** (Montana, Lincoln County; C. H. Sinclair, 1903; U. S. Coast and Geodetic Survey, 1925).—About  $1\frac{1}{4}$  miles south of Gateway, Montana, 36.2 meters west of the west rail of the Great Northern Railway, and about 35 meters north of an old house. The highway is on the east side of the railway and the railway is in a rather deep cut at this place.

Station mark: The subsurface mark is the center of the neck of a bottle set in concrete about 4 feet underground. The surface mark is a copper bolt with a cross cut in it set in the top of a granite post, 6 by 6 by 48 inches, the upper 6 inches dressed. The post is set in the ground to a depth of 40 inches, leaving about 8 inches projecting above the surface. The letters "U. S. C. B." are cut in the corners of the top of the post. A bronze bench-mark disk stamped "2362 feet, datum G. N." is set in the post 0.064 meter north of the station-mark bolt.

**Galbreath** (Montana, Glacier County; U. S. Geological Survey; International Boundary Commission, 1909; U. S. Coast and Geodetic Survey, 1923).—On the highest point of the east end of the ridge between the Galbreath Basin and the North Fork of Milk River and about one-half mile west of a low saddle in the ridge. The station is about 5 miles south of the International Boundary and about the same distance southwest of the United States Customhouse. It is  $1\frac{1}{4}$  miles south of the U. S. Reclamation Service canal and is near the quarter-section corner on the south side of sec. 25, T. 37 N., R. 13 W., principal meridian.

Station mark: An aluminum bolt set in a large granite boulder flush with the ground.

**Stack** (Montana, Glacier County; C. H. Sinclair, 1909; U. S. Coast and Geodetic Survey, 1923).—On a rolling ridge between the North Fork of Milk River and the International Boundary, about  $2\frac{1}{4}$  miles south of Monument 298, and in sec. 14, T. 37 N., R. 12 W., principal meridian, near the quarter corner on the east side of the section. The station is on the extreme northern part of the ridge and overlooks the Galbreath Basin.

Station mark: A drill hole in a granite boulder flush with the ground. An arrow, cut on a small outcropping boulder, and pointing toward the station, is 12.80 meters from the station in azimuth  $18^{\circ}03'02''$ . A similar mark is 12.40 meters from the station in azimuth  $200^{\circ}53'10''$ . A third arrow pointing toward the station is cut on the nearest of three large boulders 45 paces west-southwest of the station.

**G. L. O. No. 53** (Montana, Glacier County; U. S. Coast and Geodetic Survey, 1923).—About 9 miles west and 22 miles north of Browning, Montana, 4 miles southeast of Duck Lake, about  $1\frac{1}{2}$  miles north of the north fork of the North Fork of Milk River,  $1\frac{1}{2}$  miles west of the Davis ranch, and on land owned by Molly Davis. The station is the quarter-section corner between secs. 25 and 30, T. 36 N., Rs. 12 and 13 W., principal meridian.

Station mark: U. S. Land Office bronze disk, stamped with the numbers of the sections and the designation of the corner, set in a boulder with the top 6 inches below the surface of the ground. A U. S. Land Office bronze-disk reference mark is set in a boulder projecting 6 inches above the ground 53.525 meters from the station.

**G. L. O. No. 52** (Montana, Glacier County; U. S. Coast and Geodetic Survey, 1922).—About 200 meters southwest of station "Mussetter." See description of "Mussetter."

Station mark: U. S. Land Office bronze disk marking the standard quarter corner on the south side of sec. 34, T. 37 N., R. 11 W., principal meridian. The disk is inscribed "S. C.  $\frac{1}{4}$  S. 34, 1923", and is set in the top of a concrete block 24 by 24 by 36 inches in size placed with its top 4 inches underground. A U. S. Land Office reference mark was later set 12.28 meters from the station.

**G. L. O. No. 51** (Montana, Glacier County; U. S. Coast and Geodetic Survey, 1922).—On the International Boundary about 40 miles west of Sweetgrass, Montana, and about 265 meters east of Monument 306. The station is the closing corner of sec. 1, T. 37 N., R. 10 W., and sec. 6, T. 37 N., R. 9 W., principal meridian.

Station mark: U. S. Land Office bronze disk, inscribed with the section, township, and range numbers, and set in a concrete block 24 inches in diameter and 36 inches deep, its top flush with the surface of the ground. Two U. S. Land Office bronze-disk reference marks are set in concrete blocks similar to the station mark but projecting 6 inches above the ground. The first is 16.072 meters from the station in azimuth  $310^{\circ}17'57''$ . The second is 19.482 meters from the station in azimuth  $52^{\circ}22'54''$ .

**G. L. O. No. 50** (Montana, Glacier County; U. S. Coast and Geodetic Survey, 1922).—About 35 miles west, and 6 miles south of Sweetgrass, Montana, 19 miles north and 17 miles west of Cut Bank, Montana, 3 miles east of Crofts Lake, 3 miles south of South Fork of Milk River, 4 miles north of Buffalo Lake, and 100 meters west of the Cut Bank-Milk River wagon road. The station is the standard corner of sec. 31, T. 37 N., R. 8 W., and sec. 36, T. 37 N., R. 9 W., principal meridian.

Station mark: U. S. Land Office bronze disk, inscribed with the section, township, and range numbers, set in the top of a concrete block 24 by 24 by 36 inches, projecting 6 inches above the ground. There are two reference marks set by the Land Office at a later date, one 18.14 meters from the station, and the other 20.58 meters from the station.

**Bench** (Alberta, Lethbridge District; C. H. Sinclair, 1910; U. S. Coast and Geodetic Survey, 1923).—On a plateau, about one-half mile northeast of Monument 309 of the International Boundary, and in SE $\frac{1}{4}$  sec. 4, T. 1, R. 21 W., fourth meridian. It is about one-fourth mile west of the edge of the plateau where the terrain slopes very steeply to the southeast down to the valley of the South Fork of Milk River.

Station mark: An International Boundary Commission bronze-disk station mark set in a block of concrete.

**Track** (Montana, Glacier County; C. H. Sinclair, 1910; U. S. Coast and Geodetic Survey, 1923).—About 19 miles west of Sweetgrass, Montana, about one-third mile south of the International Boundary, and about three-fourths mile southeast of Monument 320. The station is on the east end of a ridge in sec. 3, T. 37 N., R. 6 W., principal meridian, and is one-half mile west of the east fence of the Blackfeet Indian Reservation.

Station mark: A drill hole in the center of a large triangle cut in a granite boulder.

**Headlight Butte** (Montana, Glacier County; U. S. Geological Survey; U. S. Coast and Geodetic Survey, 1923).—On the highest rock of Headlight Butte, about one-half mile east of the mail road from Cut Bank, Montana, to Komer post office, Montana, about 11 miles north of Cut Bank and 9 miles south of Komer, near the center of sec. 18, T. 35 N., R. 5 W., principal meridian. Headlight Butte is conspicuous, being the only outcrop of bare rock in the vicinity. All other hills in the same vicinity are rounding and grass covered.

Station mark: A standard U. S. G. S. bronze-disk station mark set in solid rock.

**G. L. O. No. 49** (Montana, Toole County; U. S. Coast and Geodetic Survey, 1922).—About 10 miles west and 6 miles south of Sweetgrass, Montana,  $1\frac{1}{2}$  miles north and one-half mile west of Demers post office at Fitzpatrick Lake. The station is on the north slope of a low ridge having a generally east-and-west trend. It is the standard corner of sec. 36, T. 37 N., R. 5 W., and sec. 31, T. 37 N., R. 4 W., principal meridian.

Station mark: U. S. Land Office bronze disk set in a boulder 5 inches below the surface of the ground and inscribed with the section, township, and range numbers. Two U. S. Land Office bronze-disk reference marks are set in boulders projecting 6 inches above the ground. Reference mark No. 1 is 207.353 meters from

the station in azimuth  $121^{\circ}59'58''$ . Reference mark No. 2 is 17.142 meters from the station in azimuth  $244^{\circ}17'56''$ . Reference mark No. 1 was occupied as an eccentric station.

**G. L. O. No. 48** (Montana, Toole County; U. S. Coast and Geodetic Survey, 1923).—The quarter-section corner for secs. 21 and 28, T. 36 N., R. 4 W., principal meridian. It is about 10 miles south and 8 miles west of Sweetgrass, Montana,  $1\frac{1}{4}$  miles south of Demers post office, which is at the Fitzpatric ranch on Fitzpatric Lake. The station is about 200 meters west of the McCormick ranch house, on land owned and occupied by Mrs. Martha McCormick, and is about 210 meters west of triangulation station "McCormick."

Station mark: A standard U. S. Land Office bronze disk, marked with the numbers of the corner and the date "1923", cemented in a granite boulder 30 by 14 by 12 inches in size and placed  $\frac{1}{2}$  inches underground. Over this is placed a granite boulder, 14 by 6 by 6 inches in size, marked " $\frac{1}{4}$ " on the north face and witnessed by a mound of stone to the north. The reference mark, a standard bronze disk, with the arrow pointing toward the station, and stamped "Reference No. 1, 1923", is set in a granite boulder in place having an exposed surface of 20 by 36 inches, 4 inches above the surface of the ground. The reference mark is 11.40 meters from the station in azimuth  $7^{\circ}57'34''$ .

**Tennant** (Alberta, Lethbridge District; J. J. McArthur, 1908; U. S. Coast and Geodetic Survey, 1923).—On the highest point of an east-and-west ridge about  $1\frac{1}{2}$  miles north-by-west of Sweetgrass, Montana, and about one-fourth mile north of the Canadian Pacific Railway. The station is in a pasture and is on the highest point in the immediate vicinity.

Station mark: An International Boundary Commission bronze-disk station mark set in a boulder.

**Moberly** (Montana, Toole County; C. H. Sinclair, 1908; U. S. Coast and Geodetic Survey, 1923).—On the highest point on the north end of a ridge  $1\frac{1}{2}$  miles south of Sweetgrass, Montana, and near the center of sec. 11, T. 37 N., R. 3 W., principal meridian.

Station mark: An International Boundary Commission bronze-disk station mark set in a rock.

**G. L. O. No. 33** (Montana, Liberty County; U. S. Coast and Geodetic Survey, 1923).—The quarter-section corner between secs. 25 and 30, T. 33 N., Rs. 7 and 8 E., principal meridian.

Station mark: U. S. Land Office brass disk, marked " $\frac{1}{4}$ , S 25, S 30, 1923", set in concrete 6 inches underground. Over the station mark is a granite boulder 14 by 10 by 8 inches in size, marked " $\frac{1}{4}$ " on the west face. The reference mark is a brass disk, bearing an arrow pointing toward the station, and the inscription "Reference 1923", set in concrete 6 inches above the surface of the ground, 11.92 meters from the station in azimuth  $90^{\circ}40'42''$ .

**Sweetgrass** (Montana, Liberty County; U. S. Coast and Geodetic Survey, 1923).—On the top of the highest and most northeastern of the Sweetgrass Hills. This mountain culminates in a double peak, and the station is on the northern and slightly higher of the two peaks. Triangulation station "Hill" is located on the southern peak of this mountain. This station "Sweetgrass" is said to be in the approximate position of a U. S. Geological Survey station "Sweetgrass", but no actual tie between the two stations is recorded.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark wedged in a drill hole in a boulder. The subsurface mark is a copper bolt set with cement in bedrock. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, set in concrete in a depression in outcropping bedrock, 10.50 meters from the station in azimuth  $64^{\circ}$  magnetic. Reference mark No. 2 is a like bronze disk set in the same manner, 9.45 meters from the station in azimuth  $112^{\circ}$  magnetic.

**Chester** (Montana, Liberty County; J. J. McArthur, 1908; U. S. Coast and Geodetic Survey, 1923).—On the noticeably highest point of an east-and-west ridge, about  $7\frac{1}{4}$  miles due south of Monument 368 of the International Boundary, 5 miles north and 6 miles west of the Alma, Montana, post office. The station is near the middle of the south side of SW $\frac{1}{4}$  sec. 12, T. 36 N., R. 6 E., principal meridian, and is about 25 meters north of the section-line road.

Station mark: The original mark was an International Boundary Commission bronze-disk station mark set in a boulder. In 1923 this disk was reset in the top of a square post of concrete, its position being held. A standard U. S. C. & G. S. bronze-disk station mark was set in a concrete block 3 feet underground for a subsurface mark. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, set in the top of a square concrete post, 330.32 meters from the station in azimuth  $72^{\circ}12'38''$ . Reference mark No. 2 is a like bronze disk set in a similar manner, 101.32 meters from the station in azimuth  $357^{\circ}08'04''$ .

**G. L. O. No. 34** (Montana, Liberty County; U. S. Coast and Geodetic Survey, 1923).—The corner for secs. 11, 12, 13, and 14, T. 36 N., R. 6 E., principal meridian.

Station mark: U. S. Land Office brass disk, marked with the numbers of the sections, township, and range, cemented in a drill hole in a granite boulder 32 by 16 by 16 inches in size, set 6 inches underground. Set over the station mark, and in the center of the cross-roads, is a granite boulder 14 by 8 by 6 inches in size, marked with 4 notches on the south face and with 1 notch on the east face, and witnessed by 4 pits. Reference mark



No. 1 is a brass disk cemented in a sandstone boulder 26 by 16 by 14 inches in size set 4 inches above the surface of the ground, in a fence corner, 13.77 meters from the station in azimuth  $315^{\circ}52'27''$ . Reference mark No. 2 is reference mark No. 1 for station "Chester." It is a U. S. C. & G. S. standard bronze-disk reference mark set in the top of a square concrete post in a fence corner, 14.73 meters from the station in azimuth  $218^{\circ}00'50''$ .

**Center VI** (Alberta, Medicine Hat District; J. J. McArthur, 1908; U. S. Coast and Geodetic Survey, 1923).—About midway between Monuments 366 and 367 of the International Boundary and a few meters north of the line. The station is on a small knoll about 60 meters north of a fence and 3 meters east of the Pinhorn custom-house.

**Station mark:** The original station mark was an International Boundary Commission bronze-disk station mark set in a rock. In 1923 the station was re-marked by setting the original bronze disk in the top of a square concrete post, holding the original position of the station. A subsurface mark was placed under it consisting of a standard U. S. C. & G. S. bronze-disk triangulation mark set in a block of concrete 3 feet underground. Reference mark No. 1 is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, set in the top of a square concrete post 72.60 meters from the station in azimuth  $131^{\circ}14'31''$ . Reference mark No. 2 is a like mark set in a similar manner, 76.57 meters from the station in azimuth  $51^{\circ}17'16''$ .

**Alma** (Montana, Liberty County; U. S. Coast and Geodetic Survey, 1923).—About 18 miles due north of Joplin, Montana, on the main road from Joplin to Alma post office and store and near the store, on land owned by H. A. Baldwin. The station is on a high point of a broad flat ridge and is about 1 meter inside the southeast fence-corner post of sec. 2, T. 35 N., R. 7 E., principal meridian. It is said to be in the approximate position of an old station called "Alma."

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark set in the top of a square block of concrete. The subsurface mark is a like bronze disk set in a concrete block 3 feet underground. Two standard U. S. C. & G. S. bronze-disk reference marks, with the arrows pointing toward the station, are set in square concrete blocks. The first is 19.65 meters from the station in magnetic azimuth  $68^{\circ}$ . The second is 19.70 meters from the station in magnetic azimuth  $152^{\circ}$ .

**Strode** (Montana, Liberty County; U. S. Coast and Geodetic Survey, 1923).—About  $3\frac{1}{2}$  miles south of the International Boundary and about 1 mile east of due north of Joplin, Montana. It is in SE $\frac{1}{4}$  sec. 24, T. 37 N., R. 7 E., principal meridian, about 330 meters west of the section line and road, and is on the highest point of a broad flat-topped hill.

**Station mark:** A standard U. S. C. & G. S. bronze-disk station mark set in a square block of concrete. The subsurface mark is a like mark set in a block of concrete 3 feet below the surface of the ground. Reference mark No. 1 is a U. S. C. & G. S. standard bronze-disk reference mark, with the arrow pointing toward the station, set in a square block of concrete, 67.62 meters from the station in azimuth  $340^{\circ}$  magnetic. Reference mark No. 2 is a like mark set in a similar manner, 245.90 meters from the station in azimuth  $60^{\circ}$  magnetic. The quarter-corner on the east side of the section is in the middle of the road 343.58 meters from the station in azimuth  $255^{\circ}15'09''$  true.

**G. L. O. No. 35** (Montana, Liberty County; U. S. Coast and Geodetic Survey, 1923).—About  $3\frac{1}{2}$  miles south of the International Boundary, and about 1 mile east of due north of Joplin, Montana. It is in the center of a north-and-south section-line road and marks the quarter-section corner between secs. 24 and 19, T. 37 N., Rs. 7 and 8 E., principal meridian.

**Station mark:** U. S. Land Office bronze disk, stamped with the section numbers 24 and 19 and the date 1923, cemented in a granite boulder 32 by 20 by 16 inches, placed 6 inches underground. Over this is placed a stone 18 by 14 by 8 inches in size with the figures " $\frac{1}{4}$ " cut on its west face. Triangulation station "Strode" is 343.58 meters from the station in azimuth  $75^{\circ}15'21''$ .

**G. L. O. No. 36** (Montana, Liberty County; U. S. Coast and Geodetic Survey, 1923).—The standard corner for secs. 31 and 36, T. 37 N., Rs. 8 and 9, east of the principal meridian; it is on the 9th standard parallel north and the 2nd guide meridian east. It is the center of an east-and-west road.

**Station mark:** A standard U. S. Land Office bronze disk marked with the numbers of the sections, townships, and ranges, and the date 1923, set in concrete 6 inches underground. The surface mark is a granite boulder 10 by 12 by 4 inches in size, marked with 6 notches to the north, east, and west, "SC" to the north, "8E" to the west, and "9E" to the east. Reference mark No. 1 is a bronze disk, with an arrow pointing toward the station, marked "Reference No. 1, 1923" set in a block of concrete 15.15 meters from the station in azimuth  $136^{\circ}32'05''$ . Reference mark No. 2 is a like mark, carrying its number, and set in a similar manner 14.10 meters from the station in azimuth  $217^{\circ}58'56''$ .

**G. L. O. No. 37** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923).—The corner of secs. 7, 12, 13, and 18, T. 36 N., Rs. 9 and 10 E., principal meridian.

**Station mark:** A standard U. S. Land Office bronze disk marked with the numbers of the sections, township, ranges, and the date 1923, set in a concrete block 6 inches underground. Over this is placed a granite boulder, 10 by 10 by 16 inches in size, marked with 4 grooves on the south face and 2 grooves on the north face. Refer-

ence mark No. 1 is a standard bronze disk, with an arrow pointing toward the station, marked "Reference No. 1, 1923", set in a concrete block 6 inches above the surface of the ground, 16.54 meters from the station in azimuth  $134^{\circ}25'57''$ . Reference mark No. 2 is a like mark inscribed with its number and set in a similar manner, 15.54 meters from the station in azimuth  $227^{\circ}03'28''$ .

**G. L. O. No. 38** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923).—The corner of secs. 1, 6, 31, and 36 Ts. 34 and 35 N., Rs. 10 and 11 E., principal meridian. It is at the center of crossroads.

Station mark: A standard U. S. Land Office bronze disk marked with the numbers of the corner and set in concrete 6 inches underground. Over this is a granite boulder, 14 by 10 by 8 inches in size, marked with 6 grooves on each of the four sides, and "35 N" on the north side, "34 N" on the south side, "10 E" on the west side, and "11 E" on the east side. Reference mark No. 1 is a bronze disk, with the arrow pointing toward the station, stamped "Reference No. 1, 1923", set in a cement block 6 inches above the ground, 13.12 meters from the station in azimuth  $129^{\circ}32'37''$ . Reference mark No. 2 is a like bronze disk stamped "Reference No. 2, 1923", set in a similar manner 16.93 meters from the station in azimuth  $239^{\circ}29'09''$ .

**G. L. O. No. 39** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923).—The standard corner for secs. 31 and 36, T. 37 N., Rs. 12 and 13 E. of the principal meridian; on the ninth standard parallel north and on the third guide meridian east. It is at the intersection of roads bearing north, east, and west.

Station mark: A standard U. S. Land Office bronze disk stamped with the numbers of the sections, township, and ranges, and the date 1923, set in a block of concrete 6 inches underground. Over this mark is placed a granite boulder, 16 by 12 by 8 inches in size, marked with 6 grooves on the north, east, and west faces, the number "12" on the west face, the number "13" on the east face, "S C" on the south face, and the number "37" on the north face. There are two reference marks, standard bronze disks with arrow pointing toward the station and marked, respectively, "Reference No. 1, 1923" and "Reference No. 2, 1923." Reference mark No. 1 is set in a block of concrete 6 inches above the surface of the ground, 16.99 meters from the station in azimuth  $230^{\circ}23'58''$ . Reference mark No. 2 is set in like manner, 571.42 meters from the station in azimuth  $111^{\circ}19'24''$ .

**G. L. O. No. 40** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923).—The quarter-section corner between secs. 17 and 18, T. 36 N., R. 14 E., principal meridian.

Station mark: A 1-inch iron pipe set 3 feet in the ground with its top flush with the ground and capped with a U. S. Land Office bronze disk inscribed with the numbers of the corner and the dates 1912 and 1923. One reference mark, a bronze disk with an arrow pointing toward the station and stamped "Reference, 1923", is set in a concrete block 6 inches above the surface of the ground 8.48 meters to the westward of the station.

**Havre** (Montana, Hill County; J. J. McArthur, 1908; U. S. Coast and Geodetic Survey, 1923).—About 3.7 miles south of the International Boundary, about 27 miles north and 19 miles west of Havre, Montana, and 1 mile northwest of the Pioneer School, District No. 67. It is in the southwest corner of SW $\frac{1}{4}$  sec. 24, T. 37 N., R. 12 E., principal meridian.

Station mark: A standard U. S. C. & G. S. bronze-disk station mark set in a square block of concrete. The subsurface mark is a copper bolt set in and projecting a little above the surface of a block of concrete 3 feet underground. The reference mark is a standard U. S. C. & G. S. bronze-disk reference mark, with the arrow pointing toward the station, set in a square block of concrete 427.03 meters from the station in azimuth  $197^{\circ}$  magnetic. The southwest corner post of section 24 is about 1 meter from the reference mark.

**Thibedeau** (Montana, Hill County; U. S. Geological Survey; U. S. Coast and Geodetic Survey, 1923).—See station "Havre South Base."

**G. L. O. No. 41** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923).—The quarter corner between secs. 22 and 23, T. 37 N., R. 16 E., principal meridian. It is about 4 miles south of the International Boundary and is nearly north of Havre, Montana.

Station mark: A standard 1-inch iron pipe capped with a U. S. Land Office bronze disk set in concrete 3 feet in the ground and projecting 4 inches above the surface of the ground. The bronze disk is stamped with the numbers of the corner and the dates 1911 and 1923. One reference mark, a bronze disk with the arrow pointing toward the station and stamped "Reference, 1923" is set in a block of concrete 6 inches above the surface of the ground, 8.86 meters from the station in azimuth  $89^{\circ}19'$ .

**G. L. O. No. 42** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923).—The standard corner for secs. 31 and 36, T. 37 N., Rs. 16 and 17 E. of the principal meridian; on the ninth standard parallel north and the Yantic guide meridian.

Station mark: A standard U. S. Land Office bronze disk, marked with the numbers of the corner and the date 1923, set in concrete 6 inches underground. Over this is placed a granite boulder, 12 by 10 by 5 inches in size, marked with 6 notches on the east and west faces, and "S C 37 N" on the north face, and witnessed by three pits. Reference mark No. 1 is a bronze disk, with the arrow pointing toward the station, stamped "Reference No. 1, 1923", set in concrete flush with the ground 18.70 meters from the station in azimuth  $239^{\circ}47'02''$ . Reference mark No. 2 is a like bronze disk, stamped "Reference No. 2, 1923", set in a similar manner 14.25 meters from the station in azimuth  $32^{\circ}29'44''$ .

**Forks** (Montana, Blaine County; U. S. Geological Survey; J. J. McArthur, 1908; U. S. Coast and Geodetic Survey, 1923).—About 16 miles north and  $5\frac{1}{2}$  miles west of Chinook, Montana, and about one-half mile west of the North Fork of Milk River. It is in SW $\frac{1}{4}$  sec. 3, T. 35 N., R. 18 E., principal meridian; in a grain field on a gentle slope which increases in elevation to the westward.

Station mark: A standard U. S. G. S. 3-inch iron pipe with bronze cap set in a block of concrete. A standard U. S. C. & G. S. bronze-disk reference mark with the arrow pointing toward the station is set in the center of a square block of concrete 241.23 meters from the station in azimuth  $141^{\circ}19'17''$ .

**West Cherry** (Montana, Blaine County; U. S. Geological Survey; International Boundary Commission; Geodetic Survey of Canada, 1922; U. S. Coast and Geodetic Survey, 1923).—About 19 miles north and 12 miles east of Chinook, Montana, on the top of one of the several ridges of the same height locally known as the Cherry Ridges. The station is on the more northern of two prominent hills near the northern extremity of the ridge.

Station mark: A standard U. S. G. S. brass station-mark disk fixed on top of a 3-inch iron pipe firmly set in the ground.

**G. L. O. No. 43** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923).—The standard corner of secs. 31 and 36, T. 37 N., Rs. 19 and 20 E. of the principal meridian; on the ninth standard parallel north.

Station mark: A standard U. S. Land Office bronze disk, marked with the numbers of the section, township, and ranges and the date 1923, set in concrete 6 inches underground. Over this is placed a granite boulder, 12 by 10 by 8 inches in size, marked with 6 notches and "S C 37 N" on the north face, 6 notches and "19" on the west face, and 6 notches and "20" on the east face; there are three witness pits. Reference mark No. 1 (used as an eccentric station) is a standard bronze disk, with the arrow pointing toward the station, stamped "Reference No. 1, 1923", set in concrete 94.46 meters from the station in azimuth  $51^{\circ}08'56''$ . Reference mark No. 2 is a like bronze disk, stamped "Reference No. 2, 1923", set in concrete 11.70 meters from the station in a southeasterly direction. From the information given, the azimuth may be either  $316^{\circ}22'42''$  or  $339^{\circ}51'02''$ .

**G. L. O. No. 44** (Montana, Hill County; U. S. Coast and Geodetic Survey, 1923).—The closing corner, on the International Boundary Line, of secs. 1 and 6, T. 37 N., Rs. 22 and 23 E., principal meridian.

Station mark: A standard U. S. Land Office bronze disk, marked with the numbers of the corner and "Canada 1923", set in a concrete block flush with the surface of the ground. Beside the mark is a granite boulder, 12 by 10 by 8 inches in size, marked "37 N" on the top, "BP" on the north side, with 6 notches on the east side, "C C" and 6 notches on the south side, and "22 E" and 6 notches on the west side. Reference mark No. 1 is a standard bronze disk, with the arrow pointing toward the station, stamped "Reference No. 1, 1923", set in a block of concrete 16.81 meters from the station in azimuth  $7^{\circ}29'30''$ . Reference mark No. 2 is a U. S. G. S. bronze bench-mark disk on top of a 3-inch iron pipe firmly planted in the ground 1.625 meters from the station in azimuth  $302^{\circ}08'20''$ .

**Tubs** (Montana, Blaine County; J. J. McArthur, 1909; Geodetic Survey of Canada, 1922).—About 5 miles south of International Boundary Monument 433, in SE $\frac{1}{4}$  sec. 27, T. 37 N., R. 22 E., principal meridian. The station is on the highest part of an east-and-west ridge.

Station mark: A bronze disk set in a boulder.

**S-313** (Montana, Blaine County; J. J. McArthur, 1909; Geodetic Survey of Canada, 1922).—About one-half mile south of International Boundary Monument 428, in SE $\frac{1}{4}$  sec. 4, T. 37 N., R. 21 E., principal meridian. The station is on the highest spur of the hill.

Station mark: A bronze disk set in a boulder.

**Rounds** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909; Geodetic Survey of Canada, 1922).—About 4 miles north of International Boundary Monument 433, in NE $\frac{1}{4}$  sec. 24, T. 1, R. 22 W., third meridian. The station is on the noticeable high point.

Station mark: A bronze disk set in a boulder.

**G. L. O. No. 1** (Montana, Blaine County; Geodetic Survey of Canada, 1922).—The General Land Office corner of secs. 10, 11, 14, and 15, T. 36 N., R. 21 E., principal meridian.

**D. L. S. No. 1** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—The Dominion Lands Survey post at the northeast corner of sec. 21, T. 4, R. 22 W., third meridian.

**D. L. S. No. 2** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—The Dominion Lands Survey post at the northeast corner of sec. 34, T. 1, R. 22 W., third meridian.

**Divide** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—In NW $\frac{1}{4}$  sec. 35, T. 2, R. 25 W., third meridian. The station is on the highest point of the section near the west end of the plateau known as "the old man on his back", and about  $1\frac{1}{2}$  miles west of U. S. Coast and Geodetic Survey station "Old Man."

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is the northeast corner of sec. 34, 304.71 meters from the station in azimuth  $120^{\circ}01'32''$ .

**D. L. S. No. 3** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—Dominion Lands Survey post at the northeast corner of sec. 34, T. 2, R. 25 W., third meridian.

**Wylie** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—Near the center of sec. 33, T. 2, R. 24 W., third meridian; on top of the most prominent knoll in the vicinity.

Station mark: A standard Geodetic Survey of Canada station mark; see page 333. The reference mark is a Dominion Lands Survey post at the northeast corner of the above section, 1,328.1 meters from the station in azimuth  $219^{\circ}22'22''$ .

**D. L. S. No. 4** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—The Dominion Lands Survey post at the northeast corner of sec. 33, T. 2, R. 24 W., third meridian.

**G. L. O. No. 2** (Montana, Blaine County; Geodetic Survey of Canada, 1922).—The General Land Office corner between secs. 8, 9, 16, and 17, T. 37 N., R. 24 E., principal meridian.

**D. L. S. No. 5** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—The Dominion Lands Survey post at the northeast corner of sec. 14, T. 3, R. 20 W., third meridian.

**D. L. S. No. 6** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 4, T. 2, R. 19 W., third meridian.

**D. L. S. No. 7** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—The Dominion Lands Survey post at the northeast corner of sec. 9, T. 3, R. 18 W., third meridian.

**G. L. O. No. 3** (Montana, Blaine County; Geodetic Survey of Canada, 1922).—The General Land Office quarter-section corner between secs. 17 and 20, T. 37 N., R. 26 E., principal meridian.

**D. L. S. No. 8** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—The Dominion Lands Survey post at the northeast corner of sec. 31, T. 2, R. 16 W., third meridian.

**G. L. O. No. 4** (Montana, Blaine County; Geodetic Survey of Canada, 1922).—The General Land Office corner between secs. 27, 28, 33, and 34, T. 37 N., R. 28 E., principal meridian.

**D. L. S. No. 9** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 4, T. 1, R. 14 W., third meridian.

**Center XV** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909; Geodetic Survey of Canada, 1922).—In SW $\frac{1}{4}$  sec. 2, T. 1, R. 14 W., third meridian. The station is on the largest knoll in the vicinity, a short distance north of the International Boundary, and about 400 meters west of Monument 465.

Station mark: A drill hole in a boulder.

**G. L. O. No. 5** (Montana, Phillips County; Geodetic Survey of Canada, 1922).—The General Land Office quarter-section corner between sec. 1, T. 37 N., R. 31 E., and sec. 6, T. 37 N., R. 32 E., principal meridian.

**T. S. B. M. No. 31** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1922).—Topographical Survey of Canada bench mark No. 31, east outline of range 13. This bench mark is 97.8 meters north of the southeast corner of sec. 1, T. 1, R. 13 W., third meridian.

**G. L. O. No. 6** (Montana, Phillips County; Geodetic Survey of Canada, 1923).—The General Land Office quarter-section corner between secs. 17 and 20, T. 37 N., R. 34 E., principal meridian.

**D. L. S. No. 10** (Saskatchewan, Maple Creek District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey quarter-section post on the west boundary of sec. 11, T. 4, R. 10 W., third meridian.

**D. L. S. No. 11** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 20, T. 2, R. 9 W., third meridian.

**D. L. S. No. 12** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey post at the southeast corner of sec. 2, T. 3, R. 7 W., third meridian.

**G. L. O. No. 7** (Montana, Valley County; Geodetic Survey of Canada, 1923).—The General Land Office quarter-section corner between secs. 13 and 14, T. 36 N., R. 37 E., principal meridian.

**D. L. S. No. 13** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey post at the northeast corner of sec. 33, T. 2, R. 5 W., third meridian.

**G. L. O. No. 8** (Montana, Valley County; Geodetic Survey of Canada, 1923).—The General Land Office corner mark at the southeast corner of sec. 36, T. 37 N., R. 39 E., principal meridian.

**G. L. O. No. 9** (Montana, Valley County; Geodetic Survey of Canada, 1923).—The General Land Office corner between secs. 11, 12, 13, and 14, T. 36 N., R. 41 E., principal meridian.

**D. L. S. No. 14** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey post at the northeast corner of sec. 12, T. 2, R. 3 W., third meridian.

**D. L. S. No. 15** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 3, T. 3, R. 1 W., third meridian.

**G. L. O. No. 10** (Montana, Valley County; Geodetic Survey of Canada, 1923).—The General Land Office corner mark at the northeast corner of sec. 1, T. 36 N., R. 43 E., principal meridian.

**G. L. O. No. 11** (Montana, Valley County; Geodetic Survey of Canada, 1923).—The General Land Office quarter-section corner between secs. 30 and 31, T. 36 N., R. 45 E., principal meridian.

**D. L. S. No. 16** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey post at the northeast corner of sec. 22, T. 2, R. 29 W., second meridian.

**D. L. S. No. 17** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 7, T. 1, R. 27 W., second meridian.

**D. L. S. No. 18** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey quarter-section post on the north boundary of sec. 12, T. 2, R. 26 W., second meridian.

**G. L. O. No. 12** (Montana, Daniels County; Geodetic Survey of Canada, 1923).—The General Land Office quarter-section corner between secs. 14 and 23, T. 37 N., R. 49 E., principal meridian.

**G. L. O. No. 13** (Montana, Daniels County; Geodetic Survey of Canada, 1923).—The General Land Office quarter-section corner between secs. 24 and 25, T. 35 N., R. 50 E., principal meridian.

**Madoc School** (Montana, Daniels County; Geodetic Survey of Canada, 1923).—The school at Madoc.  
Station mark: The base of the flagpole.

**D. L. S. No. 19** (Saskatchewan, Wood Mountain District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 17, T. 1, R. 23 W., second meridian.

**Flaxville Church** (Montana, Daniels County; Geodetic Survey of Canada, 1923).—The Roman Catholic church at Flaxville.  
Station mark: The center line of the spire.

**Fire** (Montana, Daniels County; C. H. Sinclair, 1911; Geodetic Survey of Canada, 1923).—About 1¼ miles south of International Boundary Monument 549. The station is on a ridge that tends southwesterly from the boundary. It is about one-half mile east of station "Pebble."  
Station mark: Probably a bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**G. L. O. No. 14** (Montana, Sheridan County; Geodetic Survey of Canada, 1923).—The General Land Office lot corner on the 49th parallel between lots 1 and 2, sec. 5, T. 37 N., R. 53 E., principal meridian.

**G. L. O. No. 15** (Montana, Sheridan County; Geodetic Survey of Canada, 1923).—The General Land Office quarter-section corner between secs. 2 and 11, T. 34 N., R. 53 E., principal meridian.

**G. L. O. No. 16** (Montana, Sheridan County; Geodetic Survey of Canada, 1923).—The General Land Office corner between secs. 23, 24, 25, and 26, T. 37 N., R. 54 E., principal meridian.

**Dooley School** (Montana, Sheridan County; Geodetic Survey of Canada, 1923).—The school at Dooley.  
Station mark: The base of the flagpole.

**D. L. S. No. 20** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey post at the northeast corner of sec. 28, T. 1, R. 18 W., second meridian.

**D. L. S. No. 21** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey post at the northeast corner of sec. 26, T. 1, R. 16 W., second meridian.

**D. L. S. No. 22** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey quarter-section post on the north boundary of sec. 8, T. 1, R. 14 W., second meridian.

**Oslo Church** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—The church near the northwest corner of sec. 8, T. 163 N., R. 102 W., fifth principal meridian.  
Station mark: The center line of the spire.

**Pleasant Valley Church** (Montana, Sheridan County; Geodetic Survey of Canada, 1923).—The Lutheran church near the southeast corner sec. 12, T. 37 N., R. 57 E., principal meridian.  
Station mark: The center line of the spire.

**Cut** (Montana, Sheridan County; C. H. Sinclair, 1911; Geodetic Survey of Canada, 1923).—About two-thirds mile south of International Boundary Monument 577, in the west half of sec. 4, T. 37 N., R. 57 E., principal meridian. The station is on the highest and most prominent hill in the vicinity.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**High** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911; Geodetic Survey of Canada, 1923).—About three-fourths mile northwest of International Boundary Monument 575, in NE¼ sec. 6, T. 1, R. 17 W., second meridian. The station is on a prominent knoll of a ridge lying in a northeast-and-southwest direction. A small dry lake lies about 100 meters north of the station and another small dry lake about 150 meters to the northeast.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Norge School** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—Norge School No. 1011, in the NW¼ sec. 11, T. 1, R. 16 W., second meridian.

Station mark: The base of the flagpole.

**Summit School** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—The school in the NE¼ sec. 33, T. 1, R. 15 W., second meridian.

Station mark: The base of the flagpole.

**G. L. O. No. 17** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—The General Land Office corner between secs. 3 and 4, T. 162 N. and secs. 33 and 34, T. 163 N., R. 101 W., fifth principal meridian.

**Church No. 1** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—The Danish Lutheran church near the northwest corner sec. 12, T. 161 N., R. 103 W., fifth principal meridian.

Station mark: The center line of the spire.

**Alkabo School** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—The school at Alkabo.

Station mark: The base of the flagpole.

**G. L. O. No. 18** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—The General Land Office corner between secs. 2, 3, 10, and 11, T. 163 N., R. 101 W., fifth principal meridian.

**Fortuna School** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—The school at Fortuna.

Station mark: The base of the flagpole.

**D. L. S. No. 23** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey quarter-section post on the north boundary of sec. 10, T. 1, R. 13 W., second meridian.

**Colgan School** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—The school at Colgan.

Station mark: The base of the flagpole.

**Twin Butte Church** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—The church near the northwest corner of sec. 19, T. 162 N., R. 99 W., fifth principal meridian.

Station mark: The center line of the spire.

**D. L. S. No. 24** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—The Dominion Lands Survey quarter-section post on the north boundary of sec. 24, T. 1, R. 12 W., second meridian.

**Bromhead Church** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—The Lutheran church at Bromhead.

Station mark: The center line of the spire.

**Lake Qu'Appelle Church** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—The church near the southwest corner of sec. 34, T. 3, R. 12 W., second meridian.

Station mark: The center line of the spire.

**Church No. 2** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1923).—The church near the southwest corner of sec. 27, T. 1, R. 12 W., second meridian.

Station mark: The center line of the spire.

**G. L. O. No. 19** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—The General Land Office corner between secs. 16, 17, 20, and 21, T. 163 N., R. 98 W., fifth principal meridian.

**Church No. 3** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—The church in sec. 12, T. 162 N., R. 99 W., fifth principal meridian.

Station mark: The center line of the spire.

**Ambrose School** (North Dakota, Divide County; Geodetic Survey of Canada, 1923).—The school at Ambrose.

Station mark: The base of the flagpole.

**D. L. S. No. 25** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The Dominion Lands Survey post at the northeast corner of sec. 10, T. 2, R. 10 W., second meridian.

**Torquay Elevator** (Saskatchewan, Weyburn District; Geodetic Survey of Canada, 1924).—The middle elevator of three at Torquay. This elevator is the property of the Saskatchewan Elevator Company.

Station mark: The southwest corner of the main building.

**Crosby Courthouse** (North Dakota, Divide County; Geodetic Survey of Canada, 1924).—The courthouse at Crosby.

Station mark: The ball on the dome.

**D. L. S. No. 26** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The Dominion Lands Survey quarter-section post on the north boundary of sec. 8, T. 2, R. 7 W., second meridian.

**G. L. O. No. 20** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The General Land Office quarter-section corner between secs. 28 and 29, T. 162 N., R. 94 W., fifth principal meridian.

**Estevan Water Tank** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The water tank at Estevan.

Station mark: The center of the tank.

**G. L. O. No. 21** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The General Land Office quarter-section corner between secs. 4 and 5, T. 163 N., R. 93 W., fifth principal meridian.

**Larson Church** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The church at Larson.

Station mark: The center line of the spire.

**D. L. S. No. 27** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 13, T. 1, R. 6 W., second meridian.

**Estevan School** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The Valleyview school at Estevan.

Station mark: The flagpole on the bell tower.

**Bienfait School** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The brick schoolhouse at Bienfait.

Station mark: The flagpole on the schoolhouse.

**Columbus Church** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The church at Columbus.

Station mark: The center line of the spire.

**Briquet Plant Water Tank** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The water tank at the briquet plant southeast of Bienfait.

Station mark: The center of the tank.

**D. L. S. No. 28** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The Dominion Lands Survey quarter-section post at the middle of the south boundary of sec. 1, T. 1, R. 5 W., second meridian.

**G. L. O. No. 22** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The General Land Office quarter-section corner in T. 162 N. between sec. 7, R. 91 W., and sec. 12, R. 92 W., fifth principal meridian.

**Lignite Church** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The Swedish church of Lignite. This church has a square tower.

Station mark: The center of the tower.

**Portal Chimney** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The chimney of the Soo Railway shops at Portal.

Station mark: The center of the chimney.

**G. L. O. No. 23** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The General Land Office quarter-section corner between secs. 34 and 35, T. 163 N., R. 90 W., fifth principal meridian.

**Flaxton School** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The school at Flaxton.

Station mark: The base of the flagpole.

**D. L. S. No. 29** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 12, T. 1, R. 3 W., second meridian.

**Frobisher Elevator** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The eastern of three elevators at Frobisher.

Station mark: The south end of the ridge of the elevator roof.

**Church No. 4** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The church 1½ miles east and 2 miles north of Flaxton.

Station mark: The center line of the spire.

**Alameda School** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The school at Alameda.

Station mark: The center of the square tower.

**D. L. S. No. 30** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The Dominion Lands Survey quarter-section post on the north boundary of sec. 16, T. 1., R. 1 W., second meridian.

**Perella Elevator** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The Farmers elevator at Perella.

Station mark: The west end of the ridge of the elevator roof.

**Church No. 5** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The white church 9 miles east and 3 miles south of Flaxton. This church has a spire on the south end.

Station mark: The center line of the spire.

**Oxbow Church** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—St. Paul Church at Oxbow.

Station mark: The center line of the spire.

**G. L. O. No. 24** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The General Land Office quarter-section corner between secs. 25 and 36, T. 163 N., R. 88 W., fifth principal meridian.

**Elcott Elevator** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The white elevator at Elcott.

Station mark: The west end of the ridge of the elevator roof.

**Bowbells Water Tank** (North Dakota, Burke County; Geodetic Survey of Canada, 1924).—The elevated water tank at Bowbells.

Station mark: The center of the tank.

**G. L. O. No. 25** (North Dakota, Renville County; Geodetic Survey of Canada, 1924).—The General Land Office quarter-section corner between secs. 19 and 20, T. 163 N., R. 86 W., fifth principal meridian.

**Church No. 6** (North Dakota, Renville County; Geodetic Survey of Canada, 1924).—The isolated church near the northwest corner of sec. 25, T. 162 N., R. 87 W., fifth principal meridian. This church has a square white tower and a tall black spire.

Station mark: The center line of the spire.

**Tolley Elevator** (North Dakota, Renville County; Geodetic Survey of Canada, 1924).—The middle elevator of five at Tolley.

Station mark: The middle of the ridge of the elevator roof.

**D. L. S. No. 31** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 28, T. 1, R. 33 W., principal meridian.

**G. L. O. No. 26** (North Dakota, Renville County; Geodetic Survey of Canada, 1924).—The General Land Office quarter-section corner between secs. 1 and 2, T. 162 N., R. 85 W., fifth principal meridian.

**Morse West Base School** (North Dakota, Renville County; Geodetic Survey of Canada, 1924).—The school near the southwest corner of sec. 3, T. 163 N., R. 86 W., fifth principal meridian.

Station mark: The flagpole on the schoolhouse.

**Sherwood Church** (North Dakota, Renville County; Geodetic Survey of Canada, 1924).—St. James Church at Sherwood.

Station mark: The center line of the spire.

**Carievale Elevator** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The middle elevator of three at Carievale.

Station mark: The middle of the ridge of the elevator roof.

**D. L. S. No. 32** (Saskatchewan, Assiniboia District; Geodetic Survey of Canada, 1924).—The Dominion Lands Survey post at the northeast corner of sec. 15, T. 1, R. 30 W., principal meridian.



**G. L. O. No. 27** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1924).—The General Land Office corner between secs. 2 and 3, T. 162 N., R. 83 W., and secs. 34 and 35, T. 163 N., R. 83 W., fifth principal meridian.

**Mohall Water Tank** (North Dakota, Renville County; Geodetic Survey of Canada, 1924).—The water tank at Mohall.

Station mark: The center of the tank.

**D. L. S. No. 33** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 28, T. 1, R. 28 W., principal meridian.

**Lyleton School** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The school at Lyleton.

Station mark: The center of the belfry.

**G. L. O. No. 28** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The General Land Office quarter-section corner between secs. 35 and 36, T. 163 N., R. 81 W., fifth principal meridian.

**Antler Church** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The Lutheran church at Antler.

Station mark: The center line of the spire.

**Kuroki Elevator** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The southeastern of two elevators at Kuroki.

Station mark: The southwest end of the ridge of the elevator roof.

**Church No. 7** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The white church near the southeast corner of sec. 9, T. 162 N., R. 82 W., fifth principal meridian.

Station mark: The center line of the spire.

**D. L. S. No. 34** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 26, T. 1, R. 27 W., principal meridian.

**Cameron Elevator** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The red elevator at Cameron.

Station mark: The apex of the peaked roof of the elevator.

**G. L. O. No. 29** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The General Land Office corner between secs. 15, 16, 21, and 22, T. 163 N., R. 79 W., fifth principal meridian.

**Coulter Water Tank** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The water tank on the Canadian Pacific Railway, west of Coulter.

Station mark: The gauge pole above the tank.

**Coulter Church** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The United church at Coulter.

Station mark: The center line of the spire.

**Landa Church** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The white church at Landa. The spire is on the west end of the church.

Station mark: The center line of the spire.

**Church No. 8** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The white church, with a belfry on the east end, situated on the east side of sec. 18, T. 163 N., R. 76 W., fifth principal meridian.

Station mark: The center of the belfry.

**Carbury School** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The brick school at Carbury.

Station mark: The base of the flagpole.

**Church No. 9** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The Lutheran church about 4 miles north and 1 mile west of Roth. This church has a spire at the junction of two wings, one wing running east and the other south.

Station mark: The center line of the spire.

**Waskada Church** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The United church at Waskada.

Station mark: The center line of the spire.

**Scandia School** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The school of the Scandia Central School District,  $1\frac{1}{2}$  miles north and  $4\frac{1}{2}$  miles west of Souris.

Station mark: The center of the belfry.

**Souris School** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The brick school at Souris.

Station mark: The center of the belfry.

**Mouse River Church** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The white church with square belfry and prominent spire about 1 mile west of the southeast corner of T. 162 N, R. 79 W., fifth principal meridian.

Station mark: The center line of the spire.

**Kramer Church** (North Dakota, Bottineau County; Geodetic Survey of Canada, 1925).—The church with a tall spire at Kramer.

Station mark: The center line of the spire.

**Minto Church** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The church at Minto.

Station mark: The center line of the spire.

**Fairfax Church** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The church east of two elevators at Fairfax. This church has a chimney on the north end and a spire on the south end.

Station mark: The center line of the spire.

**Rhodes Water Tank** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The water tank at Rhodes.

Station mark: The center of the tank.

**Minto School** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The school at Minto.

Station mark: The flagpole on the belfry.

**D. L. S. No. 35** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 8, T. 3, R. 18 W., principal meridian.

**Boissevain Church** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The United church at the east end of Main St., Boissevain.

Station mark: The center line of the spire.

**Ninga Church** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The United church at Ninga.

Station mark: The center line of the spire.

**D. L. S. No. 36** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 10, T. 1, R. 17 W., principal meridian.

**Margaret Elevator** (Manitoba, Macdonald District; Geodetic Survey of Canada, 1925).—The most western elevator at Margaret.

Station mark: The apex of the peaked roof of the elevator.

**Killarney Church** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The United church at Killarney.

Station mark: The center line of the spire.

**D. L. S. No. 37** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The Dominion Lands Survey post at the northeast corner of sec. 12, T. 2, R. 16 W., principal meridian.

**D. L. S. No. 38** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The Dominion Lands Survey post at the northeast corner of sec. 29, T. 2, R. 14 W., principal meridian.

**Lena Elevator** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The Patterson elevator at Lena.

Station mark: The apex of the peaked roof of the elevator.

**Enterprise Elevator** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The lone elevator at Enterprise.

Station mark: The apex of the peaked roof of the elevator.

**Holmfild School** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The school at Holmfild.

Station mark: The center of the belfry.

**Cartwright Church** (Manitoba, Souris District; Geodetic Survey of Canada, 1925).—The United church at Cartwright.

Station mark: The center of the belfry.

**Hansboro School** (North Dakota, Towner County; Geodetic Survey of Canada, 1925).—The school at Hansboro.

Station mark: The center of the belfry.

**Mather Church** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The church with a tall black spire at Mather.

Station mark: The center line of the spire.

**Clearwater Elevator** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The Maple Leaf elevator at Clearwater.

Station mark: The apex of the peaked roof of the elevator.

**D. L. S. No. 39** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The Dominion Lands Survey quarter-section post on the north boundary of sec. 22, T. 1, R. 10 W., principal meridian.

**Crystal City Church** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The church at Crystal City.

Station mark: The center line of the spire.

**Fallison Elevator** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The lone elevator at Fallison.

Station mark: The north end of the ridge of the elevator roof.

**Purves Elevator** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The southeastern of two elevators at Purves. This elevator is sheathed with metal.

Station mark: The southwest end of the ridge of the elevator roof.

**Sarles School** (North Dakota, Cavalier County; Geodetic Survey of Canada, 1925).—The school at Sarles.

Station mark: The base of the flagpole.

**Clyde Church** (North Dakota, Cavalier County; Geodetic Survey of Canada, 1925).—The church at Clyde. This church has a prominent spire.

Station mark: The center line of the spire.

**St. Leon Church** (Manitoba, Macdonald District; Geodetic Survey of Canada, 1925).—The church at St. Leon. This church has a prominent black spire on a square white belfry at the east end of the roof.

Station mark: The center line of the spire.

**Calvin School** (North Dakota, Cavalier County; Geodetic Survey of Canada, 1925).—The two-story brick school at Calvin.

Station mark: The flagpole on the belfry.

**Pilot Mound School** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The school at Pilot Mound.

Station mark: The center line of the dome on the belfry.

**Manitou Normal School** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The Normal school at Manitou.

Station mark: The center of the round dome.

**Mariapolis Church** (Manitoba, Macdonald District; Geodetic Survey of Canada, 1925).—The church at Mariapolis. This church has a prominent spire on a square base which is open on all sides.

Station mark: The center line of the spire.

**Kaleida Elevator** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The northern of two elevators at Kaleida. This elevator is owned by Wiley Low & Co.

Station mark: The apex of the peaked roof of the elevator.

**Hannah School** (North Dakota, Cavalier County; Geodetic Survey of Canada, 1925).—The school with a belfry and flagpole at Hannah.

Station mark: The center of the belfry.

**Snowflake School** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The school at Snowflake.

Station mark: The flagpole on the schoolhouse.

**Wales Church** (North Dakota, Cavalier County; Geodetic Survey of Canada, 1925).—The taller of two church spires at Wales. This spire has a square base.

Station mark: The center line of the spire.

**Mowbray Elevator** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The Donovan elevator at Mowbray.

Station mark: The south end of the ridge of the elevator roof.

**D. L. S. No. 40** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The Dominion Lands Survey post at the northeast corner of sec. 19, T. 3, R. 7 W., principal meridian.

**Darlingford Elevator** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The easternmost of three elevators at Darlingford. This elevator is painted red.

Station mark: The apex of the peaked roof of the elevator.

**North Outlook** (Manitoba, Lisgar District; J. J. McArthur, 1911; Geodetic Survey of Canada, 1925).—About  $3\frac{1}{4}$  miles north of International Boundary Monument 792, on the highest point of a knoll on a prominent ridge running north and south, in SE $\frac{1}{4}$  sec. 20, T. 1, R. 5 W., principal meridian. The station is in a rocky pasture field.

Station mark: Originally a wooden hub. In 1919 it was re-marked as follows: A bronze disk, marked "U. S. & C. B. SURVEY", was set in the top of a granite boulder, 10 by 10 by 18 inches, set on end with the top just above the surface of the ground. The subsurface mark is a cross in a granite boulder 12 by 12 by 6 inches set 20 inches underground. The reference mark is a "V" cut in a large boulder 6.51 meters nearly due east from the station; a second reference mark is a similar "V" cut in a boulder 3 feet long and 18 inches wide, 4.66 meters nearly northwest of the station.

**South Outlook** (Manitoba, Lisgar District; J. J. McArthur, 1911; Geodetic Survey of Canada, 1925).—About 1 mile north of International Boundary Monument 792, on a little knoll on the east edge of the broken plateau overlooking the lowlands of the Red River Valley, in SE $\frac{1}{4}$  sec. 8, T. 1, R. 5 W., principal meridian, about 30 meters north and 350 meters west of the southeast corner of the section. The top of the knoll is practically bare, though there are timber and brush around it. The station is just north of a shale cut, 6 feet deep, where road material has been excavated on the section line. It overlooks the valley plains to the east.

Station mark: Originally a wooden hub. In 1919 it was re-marked as follows: A bronze disk, marked "U. S. & C. B. SURVEY", was set in the top of a granite boulder 10 by 10 by 20 inches, set on end with the top just above the surface of the ground. The subsurface mark is a cross cut in a granite boulder 10 by 10 by 6 inches set 20 inches underground. One reference mark is a cross cut on a very large granite boulder, 21.88 meters a little west of north from the station. A second reference mark is a cross cut on a very large granite boulder 20.64 meters nearly southeast of the station.

**Windygates Elevator** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The elevator at Windygates.

Station mark: The north end of the ridge of the elevator roof.

**Thornhill School** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The school at Thornhill.

Station mark: The center of the belfry.

**Sperling Elevator** (Manitoba, Macdonald District; Geodetic Survey of Canada, 1925).—The middle elevator of three at Sperling.

Station mark: The center of the elevator.

**Roland Elevator** (Manitoba, Macdonald District; Geodetic Survey of Canada, 1925).—The western of two elevators at Roland. This elevator is painted red.

Station mark: The apex of the peaked roof of the elevator.

**Kronsgart Elevator** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The lone green elevator at Kronsgart.

Station mark: The middle point of the ridge of the elevator roof.

**Church No. 10** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The church at the northeast corner of sec. 16, T. 1, R. 6 W., principal meridian.

Station mark: The center line of the spire.

**Homen Church** (North Dakota, Cavalier County; Geodetic Survey of Canada, 1925).—The white church with a tall black spire at Homen.

Station mark: The center line of the spire.

**Carman Water Tank** (Manitoba, Macdonald District; Geodetic Survey of Canada, 1925).—The elevated water tank at Carman.

Station mark: The center of the tank.

**D. L. S. No. 41** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The Dominion Lands Survey post at the northeast corner of sec. 2, T. 3, R. 5 W., principal meridian.

**Olga Church** (North Dakota, Cavalier County; Geodetic Survey of Canada, 1925).—The church at Olga. This church has a square spire on the east end and a chimney on the west end.

Station mark: The center line of the spire.

**D. L. S. No. 42** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The Dominion Lands Survey quarter-section post on the east boundary of sec. 23, T. 2, R. 3 W., principal meridian.

**Kane Elevator** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The western of two elevators at Kane. This elevator is painted yellow.

Station mark: The south end of the ridge of the elevator roof.

**Lowe Farm Elevator** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The western of two elevators at Lowe Farm. This elevator is painted yellow.

Station mark: The south end of the ridge of the elevator roof.

**Leroy Church** (North Dakota, Pembina County; Geodetic Survey of Canada, 1925).—The church at Leroy. Station mark: The cross on the spire.

**Altona Mill Chimney** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The prominent mill chimney at Altona.

Station mark: The center of the chimney.

**D. L. S. No. 43** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The Dominion Lands Survey post at the northeast corner of sec. 10, T. 2, R. 1 W., principal meridian.

**Bathgate Elevator** (North Dakota, Pembina County; Geodetic Survey of Canada, 1925).—The elevator at Bathgate.

Station mark: The west end of the ridge of the elevator roof.

**D. L. S. No. 44** (Manitoba, Provencher District; Geodetic Survey of Canada, 1925).—The survey post at the southwest corner of river lot 121 in the parish of Ste. Agathe.

**Rosenfeldt Elevator** (Manitoba, Lisgar District; Geodetic Survey of Canada, 1925).—The metal covered elevator at Rosenfeldt.

Station mark: The west end of the ridge of the elevator roof.

**Letellier Elevator** (Manitoba, Provencher District; Geodetic Survey of Canada, 1925).—The eastern of two elevators at Letellier, known as the N. M. Patterson elevator.

Station mark: The west end of the ridge of the elevator roof.

#### GEORGIA STRAIT TO LAKE OF THE WOODS, MAJOR SCHEMES

**Point Roberts 1934** (Washington, Whatcom County; A. C. Baldwin, 1934).—On the southeast point of the peninsula of Point Roberts, on the top of the bluff about 200 feet above the buildings of the Alaska Packers Association cannery on the beach. The station is about 6 meters back from the south edge of the bluff.

Station mark: A standard U. S. Coast and Geodetic Survey bronze-disk station mark set in a concrete pier. Two standard U. S. Coast and Geodetic Survey bronze-disk reference marks are set in concrete piers respectively 9.92 meters from the station in azimuth  $54^{\circ}36'26''$ , and 5.86 meters from the station in azimuth  $132^{\circ}22'26''$ .

**Oertel** (Washington, Whatcom County; A. C. Baldwin, 1934).—On the east shore of Semiahmoo Bay about 1 mile north of Birch Point. The station is on a bluff about 100 feet in height and is about 5 meters back from the edge of the bluff. The new road from Drayton Harbor to Birch Point passes within 150 meters of the station at a point where it makes a right-angle turn to the south.

Station mark: A standard U. S. Coast and Geodetic Survey bronze-disk station mark set in a concrete pier. A standard U. S. Coast and Geodetic Survey bronze-disk reference mark set in a concrete pier is 5.71 meters from the station in azimuth  $1^{\circ}08'40''$ .

**Drayton I** (Washington, Whatcom County; U. S. Coast and Geodetic Survey, 1888; 1905).—On the southwest end of the open part of the spit dividing Semiahmoo Bay from Drayton Harbor; 11 paces from the high-water mark of Semiahmoo Bay and 4 paces from that of Drayton Harbor.

Station mark: A drill hole in a stone beneath the surface of the ground. The station was found in 1905 with 3 hubs, 1.8 meters apart, set in line parallel to the shore line. The middle hub was over the station mark. A

telegraph pole stood 1.9 meters from the station nearly at right angles with the shore line and toward Drayton Harbor.

**Trap** (Washington, Whatcom County; U. S. Coast and Geodetic Survey, 1888; 1905).—On a slight point of the shore line about half way along the south side of Drayton Harbor, but nearer the head of the bay. The bluff at this point is about 15 feet high. The station is on the beach about 8 paces outward from the high-water mark. Back of the station and a little to the westward is a small ravine with water running in it in wet weather.

**Station mark:** A drill hole in a triangular boulder about 4 feet on each side and rising about 2 feet above the beach.

**Miller** (Washington, Whatcom County; E. C. Barnard, 1905).—In the city of Blaine at the intersection of Cedar Street and Washington Avenue; 3 meters from the edge of the bluff overlooking the spur of the Great Northern Railway running from the main line to the wharf; in front of D. S. Miller's house, 18.7 meters S. 36° W. from the southwest corner of his yard fence.

**Station mark:** A bronze disk set in a granite boulder flush with the surface of the ground.

**Creek** (Washington, Whatcom County; U. S. Coast and Geodetic Survey, 1888; 1905).—At the head of Drayton Harbor, on a point just west of the mouth of California Creek. The station is on a bluff 8 feet high and it is about 3 paces back from the edge of the bluff. A road following the shore line from Blaine turns in-shore here and cuts across the point. A fence is inside the road. The distance to the station from the angle of the fence at the turn of the road is about 8 meters. A large boulder about 30 meters outside the shore line is in line with the dwelling house of Mr. Dexter. There is another large boulder about 20 meters upshore.

**Station mark:** A drill hole in a stone placed 1 foot below the surface of the ground. In 1905 two trees were marked, one N. 48°30' E., 4.4 meters distant from the station; the other S. 51°00' E., 4.7 meters distant from the station.

**Nooksack** (Washington, Whatcom County; E. C. Barnard, 1906).—Near the flat summit of Nooksack Mountain about 1 mile south of triangulation station "Sumas Mountain." The station is about 200 meters down the south side of the main ridge from the summit of the mountain and about 50 feet lower in elevation than the summit.

**Station mark:** A bronze-disk triangulation mark set 1 foot underground, over which is a stone with a drill hole in the center set flush with the surface of the ground. Over the stone is a small pile of broken rock.

**Toad** (Washington, Whatcom County; E. C. Barnard, 1905).—On a solid rock ledge, the highest point between Toad Lake and Van Wyck. This station is on a timbered hill which is a peak at the west end of a much higher ridge.

**Station mark:** A bronze-disk triangulation mark set in solid rock.

**Frances** (Washington, Whatcom County; U. S. Coast and Geodetic Survey, 1887; 1913).—On the east base of Point Frances at a point where station "John" can be seen by looking along the shore to the northward. The station is 17.1 meters north of a composition nail in a blaze on a large lone fir tree, on line to station "John." The station is on a sloping bench 6 feet above tide and 3 meters back from the beach.

**Station mark:** A half-inch drill hole 2 inches deep in a stone 8 inches below the surface of the ground.

**Chuckanut** (Washington, Whatcom County; U. S. Coast and Geodetic Survey, 1887; 1913).—On Chuckanut Point, where Chuckanut Island is just lost to view. From the station, four paces seaward brings this island in sight. The station is about 10 feet above high tide.

**Station mark:** A drill hole in solid rock. The reference mark is an arrow, pointing towards the station, cut in solid rock on line to station "Town." The point of the arrow is 3.7 meters from the station.

**John** (Washington, Whatcom County; E. C. Barnard, 1905; 1913).—One mile south of Lummi church, on a bench about 30 feet above high tide, and about 100 meters from the south end of the Fish Point village of the Lummi Indians.

**Station mark:** A bronze-disk triangulation mark set in the center of a grey granite boulder set in the ground with its top level with the surface.

**Pearson** (Washington, Whatcom County; E. C. Barnard, 1905).—On the east side of a road in a lane about 1½ miles west and one-fourth mile north of Ferndale on the east line of the Mount View school district. The station is 18.2 meters south of the north post of a gate and on the opposite side of the road.

**Station mark:** A bronze-disk triangulation mark set in a stone placed in the ground with its top level with the surface. The reference mark is 3 spikes driven in a stump 0.33 meter west of the station mark.

**Jack** (Washington, Whatcom County; E. C. Barnard, 1904).—On the highest mountain in the Ruby Creek region lying between Ruby Creek on the south and the Skagit River on the west.

**Station mark:** A triangle between the letters "U" and "S", cut in the rock, over which a 7-foot cairn was built.

**Hozomeen** (Washington, Whatcom County; E. C. Barnard, 1904; 1935).—About  $1\frac{1}{2}$  miles south of the International Boundary, and  $3\frac{1}{4}$  miles east of the Skagit River; on the highest of the high rocky peaks of the Hozomeen Range.

Station mark: An aluminum-disk station mark of the International Boundary survey of 1904–5 set in a drill hole in solid rock.

**Lightning** (British Columbia, Yale District; E. C. Barnard, 1905; 1935).—On the most northern peak of the Hozomeen Range, about  $4\frac{1}{2}$  miles north of the International Boundary and about 3 miles east of the Whitworth ranch on the Skagit River. The peak is a round and nearly bald knob.

Station mark: An aluminum triangulation disk, set in rock, over which is a 3-foot cairn.

**Smoky** (Washington, Okanogan County; E. C. Barnard, 1904; 1935).—On a high, rocky peak near the backbone of the Cascade Range and near the head of Chuwanten Creek; about  $5\frac{1}{2}$  miles south of the International Boundary and  $2\frac{1}{2}$  miles west of the Pasayten River.

Station mark: An aluminum-disk triangulation mark, set in rock, over which is a 7-foot cairn.

**Frosty West** (British Columbia, Yale District; E. C. Barnard, 1904; 1935).—On a rocky ridge, part of the summit of the Cascade Range, on the divide between the waters of Cambie Creek and Lightning Creek, about 1 mile north of the International Boundary. This station should not be confused with station “Frosty” which is on a pyramidal mountain about one-half mile to the southeast, on a point which appears more prominent when viewed from the east.

Station mark: An aluminum-disk triangulation mark, set in rotten rock, over which is a 5-foot cairn.

**Roche** (British Columbia, Yale District; E. C. Barnard, 1904; 1935).—On a bald knob on the highest point of the divide between the Similkameen and Pasayten Rivers; about  $2\frac{1}{2}$  miles north of the International Boundary.

Station mark: An aluminum-disk triangulation mark, set in rock, over which is a  $7\frac{1}{2}$ -foot cairn.

**Ashnola** (Washington, Okanogan County; E. C. Barnard, 1904; 1935).—On a high dome-shaped mountain about 5 miles south of the International Boundary, on the divide between the Ashnola and Pasayten Rivers, at the head of the east fork of the Pasayten River. It can be reached by following the divide south from Park (Sheep) Pass.

Station mark: An aluminum-disk triangulation mark set in rock over which is a 6-foot cairn.

**Princeton** (British Columbia, Yale District; E. C. Barnard, 1904; 1935).—On a grassy hill on the divide between Ashnola Creek and the Pasayten River; about 5 miles north of the International Boundary.

Station mark: An aluminum-disk triangulation mark, set in solid rock, over which is a  $3\frac{1}{2}$ -foot cairn.

**Goat** (Washington, Okanogan County; E. C. Barnard, 1904).—On a rocky peak sloping to the south on the divide between the east fork of the Methow River and Lost River, about 5 miles east of Robinson Roadhouse.

Station mark: An aluminum-disk triangulation mark, set in solid rock, over which is a  $6\frac{1}{2}$ -foot cairn.

**Windy, 1935** (Washington, Okanogan County; Jesse Hill, 1935).—About 5 miles south of the International Boundary and about 4 miles southwest of Horseshoe Pass; on the summit of Windy Mountain. This station supersedes station “Windy” of 1904 on the same mountain peak. The old station was lost during the erection of a lookout house on the summit of the mountain by the U. S. Forest Service.

Station mark: A drill hole, with a triangle cut around it, in solid rock. The north corner of the lookout is in approximate azimuth  $270^\circ$  distant 9.63 meters from the station, and the west corner of the lookout is in approximate azimuth  $297^\circ$  distant 8.14 meters from the station. The side of the lookout facing the station is 4.35 meters in length.

**Similkameen** (Washington, Okanogan County; C. H. Sinclair, 1904; 1930).—On a high grassy peak,  $1\frac{1}{4}$  miles due southeast of Nighthawk, Washington, and directly above the town.

Station mark: An aluminum disk set in a boulder projecting 8 inches above the ground.

**End** (British Columbia, Yale District; C. H. Sinclair, 1904; 1935).—About 4 miles a little east of north from Nighthawk, Washington, and about  $1\frac{3}{4}$  miles north of the International Boundary. The station is on a high peak, bare on the south edge of the summit, but heavily wooded on the north side.

Station mark: An aluminum disk set in solid rock. In 1935 the aluminum disk had been removed from the drill hole.

**Osoyoos** (Washington, Okanogan County; C. H. Sinclair, 1904; 1930).—On the summit of Kruger Mountain, a bare, high peak on the first range of mountains west of Osoyoos Lake, about 2 miles west of the lake and 1 mile south of the International Boundary.

Station mark: A drill hole in rock. It is probable that a bronze-disk station mark was set in the drill hole in 1930.

**Hump** (Washington, Okanogan County; C. H. Sinclair, 1904; 1930).—On a high, lone peak just north of a number of densely wooded peaks east of the south end of Osoyoos Lake, and about 5 miles south of the International Boundary.

Station mark: An aluminum disk set in rock.

**Sidley** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—On a bare spot on a spur ridge running nearly north and south, about 4 miles east of Osoyoos Lake and  $1\frac{1}{4}$  miles north of the International Boundary. The station is quite a little below the summit of the ridge, which is heavily timbered, and does not see any of the boundary monuments.

Station mark: An aluminum disk set in solid rock.

**Balsam** (Washington, Okanogan County; C. H. Sinclair, 1904; 1930).—On a high, grassy peak about 4 miles south of the International Boundary and about 2 miles south and a little east of Molson. A road from Molson leads nearly to the station.

Station mark: An aluminum disk set in a stone 18 by 18 by 24 inches firmly set in the ground.

**Bolster** (Washington, Okanogan County; C. H. Sinclair, 1904; 1930).—About 2 miles due west of Bolster and about 2 miles south of the International Boundary; on a high bare point, the highest in the vicinity.

Station mark: In 1930 a 2-inch bronze disk marked "U. S. & C. B. SURVEY" was set in the original drill hole marking the station.

**Tippie** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—On a high and prominent rocky peak about  $2\frac{1}{2}$  miles north of the International Boundary and about three-fourths mile east of the road between Midway and Bolster. The station, which is about three-fourths mile northwest of the most northern bend of Myers Creek, where it turns from the northeast to the southeast, is visible from the road and is easily reached from it.

Station mark: An aluminum disk set in rock.

**Copper** (Washington, Okanogan County; C. H. Sinclair, 1904; 1930).—On a high peak of Copper King Mountain and just south of the head of Gold Creek, about  $2\frac{1}{2}$  miles east of Bolster, from which town it can be easily reached by road and trail. The Caribou Mine is a short distance from the station.

Station mark: An aluminum disk set in solid rock.

**Knob** (Washington, Ferry County; C. H. Sinclair, 1904; 1930).—On a high, bare ridge 2 miles southwest of the town of Midway, British Columbia, the second bare knob south of the International Boundary. The station can be easily reached by going up the first gulch south of the boundary and west of Kettle River, and thence up the partly wooded ridge to the summit.

Station mark: An aluminum disk marked "U. S. & C. B." set in solid rock.

**Midway** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—On the southwest end of a bare peak, the highest in the vicinity, just north and  $1\frac{1}{2}$  miles distant from the town of Midway.

Station mark: Originally an aluminum disk set in solid rock. In 1930 the station was found to be re-marked by a small bronze disk bearing the letters "B. C."

**Fir** (Washington, Ferry County; C. H. Sinclair, 1904; 1930).—About three-fourths mile south of the International Boundary on a wooded peak on the main ridge running nearly north and south across the boundary about half way between Danville, Washington, and Midway, British Columbia. The station can be best reached by following around the ridge from the City of Paris Mine.

Station mark: An aluminum disk set in solid limestone.

**Eagle** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—About 4 miles north of Danville, Washington, and about 4 miles northwest of Grand Forks, on a high round-topped hill with a few large fir trees on it, locally known as Eagle Mountain. The Hesperian Mine is located on the west slope of the hill. A road from Columbia leads to a ranch on a hill one-half mile to the east, from which a trail leads to the mine.

Station mark: An aluminum disk set in rock.

**Hardy** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—On Hardy Mountain, a grassy hill 2 miles north of the International Boundary and about 4 miles west of Grand Forks, nearly due north of Danville, Washington.

Station mark: In 1930 a 2-inch bronze disk marked "U. S. & C. B. SURVEY" was set in the original drill hole marking the station.

**Grand Forks** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—On a high rocky hill overlooking and on the north side of Grand Forks. The crest of the hill runs nearly east and west. The north and the south sides of the hill are very steep. The best approach is by going up the west slope.

Station mark: An aluminum disk set in solid rock. The reference mark is a cairn 2.5 meters from the station.



**Danville West Base** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—Nearly three-fourths mile northeast of Danville, Washington, on the right-of-way of the Vancouver, Victoria & Eastern branch of the Great Northern Railway. The station is on a bank 6 meters south of the south rail, 9 meters west of the road crossing, and about 500 meters west of the west switch to Grand Forks.

Station mark: A cross on a copper bolt set in a 6- by 6- by 6-inch dressed granite block, placed 3½ feet underground. The surface mark is a cross on a copper bolt set in the top of a granite post 10 by 10 by 48 inches, set in concrete to a depth of 3 feet. The top 12 inches of this post are dressed, and the letters "U. S. C. B." are cut in the four corners of the top surface. A bench-mark disk is set in the top of the post at one side of the copper bolt.

**Danville East Base** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—On the right-of-way of the Vancouver, Victoria & Eastern branch of the Great Northern Railway about 2 miles east of the railroad station at Danville. The station is on a bank 6 meters south of the south rail of the track, 275 meters east of the road crossing, 900 meters east of the east switch to Grand Forks and 1,800 meters east of "Danville West Base."

Station mark: A cross on a copper bolt set in a 6- by 6- by 6-inch dressed granite block, placed 3½ feet underground. The surface mark is a cross on a copper bolt set in the top of a granite post 10 by 10 by 48 inches, set in concrete to a depth of 3 feet. The top 12 inches of this post are dressed, and the letters "U. S. C. B." are cut in the four corners of the top surface. A bench-mark disk is set in the top of the post at one side of the copper bolt.

**Clement** (British Columbia, Yale District; C. H. Sinclair, 1904).—About 2 miles west of Grand Forks, on a prominent knoll about 100 meters northwest of a house, and about 30 meters east of the spur of the Great Northern Railway (now abandoned) leading to Phoenix.

Station mark: An aluminum disk set in solid rock. The reference mark is a large pine tree about 3 meters west of the station.

**Sitcum** (Washington, Ferry County; C. H. Sinclair, 1904).—About 4 miles east of Danville and the same distance south of Grand Forks, British Columbia; on a high peak, overlooking the valley of Kettle River, partly timbered on the north, east, and west sides; the north side is very steep. The station may be reached by following the road from Danville up Lone Ranch Creek for about 4 miles and then climbing the ridge to its summit.

Station mark: An aluminum disk set in a large rock on the summit of the peak.

**Gilpin** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—About 4 miles east of Grand Forks and about 3 miles north of the International Boundary, just north of the northern loop of Kettle River, on the southeast point of a high peak.

Station mark: An aluminum disk set in solid rock.

**Cascade** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—About 2 miles northwest of Cascade, on a high peak. The station can be easily reached.

Station mark: A drill hole in solid rock. In 1930 a 2-inch bronze disk was set in the original drill hole.

**Owl** (Washington, Ferry County; C. H. Sinclair, 1904; 1930).—About 3 miles southwest of Laurier, on a high summit about one-fourth mile west of the abandoned Owl Mine. The trail to this mine leaves the road about 3 miles south of Laurier where the road makes a sharp bend to the left toward Kettle River.

Station mark: A drill hole in solid rock. The reference mark is an arrow cut in the rock about 3 meters to the west. In 1930 a 2-inch bronze disk was set in the original drill hole.

**Horn** (Washington, Stevens County; C. H. Sinclair, 1904).—About 1 mile south of International Boundary Monument 170, on the same low wooded ridge. The station can be reached by following the Grand Forks-Rosland road from the west as far as the summit of this ridge, and thence south along the divide to the station.

Station mark: An aluminum disk set in solid rock.

**Buck** (British Columbia, Yale District; C. H. Sinclair, 1904).—About 3 miles north of the International Boundary, on the most eastern and highest mountain on the divide at the head of the north fork of Deep Creek. The station can be reached by following north along the divide from the point where it is crossed by the Grand Forks-Rosland road.

Station mark: An aluminum disk set in rock.

**Record** (British Columbia, Kootenay West District; J. J. McArthur, 1904).—On the summit of Record Mountain west of Rosland.

Station mark: A drill hole in a rock.

**Northport** (Washington, Stevens County; Jesse Hill, 1930; 1934).—Three miles south of Northport, on the highest point south of the first creek on the west side of the valley of the Columbia River. This is not station "Northport" established by J. J. McArthur in 1904. It is probably 0.53 meter northeast of Mr. McArthur's station, the identification of which was uncertain in 1930.

Station mark: A 2-inch bronze disk, marked "U. S. & C. B. SURVEY", set in a drill hole in the outcropping rock.

**Porthill** (British Columbia, Kootenay West District; J. J. McArthur, 1904; 1934).—On first peak north of the International Boundary and west of the Kootenay Valley.

Station mark: Originally recorded as a hole drilled in rock. In 1930 the station was identified by an old tripod signal, but no drill hole was found in the loose rock under the tripod. The center of the old tripod was adopted as the station and a bronze disk for reference was set in a solid granite outcrop near the center of a clear space of several hundred feet radius, where the slope breaks to the southeast. The disk is 8.66 meters from the point adopted as the station, in azimuth  $313^{\circ}42'$ .

**Smith** (Idaho, Boundary County; J. J. McArthur, 1904; 1936).—About 5 miles south of the International Boundary, on the first culminating point on the ridge south of Smith Creek, the second ridge south of the boundary.

Station mark: Originally recorded as a drill hole in rock. In 1930 the station was identified by the remains of an old tripod signal and a scratch on the rock under the center of the tripod. This point was marked with a 2-inch U. S. & C. B. bronze-disk bench mark set in a drill hole in the rock and a triangle was cut in the center of the disk. In 1934, the apex of the roof of a U. S. Forest Service lookout that had been built over the station was found to be 1.91 meters from the station in azimuth  $5^{\circ}38'$ .

**Hawkins** (British Columbia, Kootenay East District; C. H. Sinclair, 1903; 1934).—On the partly wooded summit of the high mountain  $3\frac{1}{2}$  miles west of the Moyie River and  $1\frac{1}{4}$  miles north of the International Boundary. Boundary Monument 212 and triangulation station "Harvey" are on the same ridge, but further south. The top of the ridge is easily traveled between the stations, and trails lead south from station "Harvey" to Round Prairie.

Station mark: Originally a drill hole in solid rock. In 1934 the station was recovered and a 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" was set in the original drill hole.

**Hell Roaring** (Idaho, Boundary County; U. S. Geological Survey, 1897; 1934).—On the summit of the high mountain 2 miles west of the Moyie River and  $6\frac{1}{2}$  miles south of the International Boundary. The station can be reached by several U. S. Forest Service trails. The Queen Mine is a short distance northwest of the station.

Station mark: A  $1\frac{1}{4}$ -inch copper bolt bearing the letters "U. S. G. S." set in solid rock.

**Hunter** (British Columbia, Kootenay East District; C. H. Sinclair, 1905; 1934).—On the summit of the flat, timbered ridge between Cannuck Creek and the Moyie River; 1.7 miles north of International Boundary Monument 220; on a bare elevated spot near the eastern rim of the ridge.

Station mark: The original station mark, a drill hole in the center of a flat ledge of rock about 15 feet square, was recovered in 1934 and a 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" was set in the original drill hole.

**Mahon** (British Columbia, Kootenay East District; C. H. Sinclair, 1903; 1934).—On the summit of a long, wooded, north-and-south ridge that terminates on the south at Hawkins Creek just west of the mouth of American Creek. The station is 7 miles north of the International Boundary line, and about 4 miles northwest of the Hawkins Creek "Meadows." The area between the station and Hawkins Creek has been logged off and burned over to such an extent that the station is readily reached from Hawkins Creek.

Station mark: The original station mark, a drill hole in solid rock, was recovered in 1934 and a 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" was set in the original drill hole.

**Burke** (Montana, Lincoln County; C. H. Sinclair, 1903; 1934).—On the north end of a high mountain range between American Creek on the west and the headwaters of Hawkins Creek on the east; on the same range as, and  $1\frac{1}{2}$  miles north of the U. S. Forest Service station "Northwest Peak Lookout"; 0.9 mile south of International Boundary Monument 223. From its profile from the north the mountain is locally known as Flatiron.

Station mark: The original mark, a nail in a fir stump with a cairn built around it, was found intact in 1934. This mark was entirely removed and accurately replaced by a 3-inch bronze disk, bearing the words "INTERNATIONAL BOUNDARY COMMISSION", set with cement in a large boulder.

**Lodge** (British Columbia, Kootenay East District; C. H. Sinclair, 1903; 1934).—About 4 miles north of the International Boundary on a high, wooded summit of a north-and-south ridge that terminates on the south at the West Fork of Yaak River about three-fourths mile north of Monument 227.

Station mark: Originally a drill hole in solid rock. In 1934 the station was recovered and found marked by a small bronze disk, bearing the letters "B. C.", set in the original drill hole. This mark was left as found.

**Roswell** (Montana, Lincoln County; C. H. Sinclair, 1903; 1934).—On the highest point of a high wooded peak about 3 miles south of the International Boundary, and about 1 mile west of the West Fork of Yaak River. The station was recovered in 1934 and at that time the timber had all been fire killed for several miles around it.

**Station mark:** The original mark was a drill hole in solid rock. Although the record is not conclusive, it is believed that in 1934 a 3-inch bronze disk bearing the words "INTERNATIONAL BOUNDARY COMMISSION" was set in the original drill hole.

**Bevis** (British Columbia, Kootenay East District; C. H. Sinclair, 1903; 1934).—Four and one-half miles north of the International Boundary, on the south end of a partly bare peak in the forks of the East Fork of the North Fork of Yaak River; the north end of the peak is wooded. A trail from the North Fork of Yaak River to Gold Creek leads to the base of the mountain.

**Station mark:** The original station mark was a drill hole in solid rock. The station was recovered in 1934 and found marked with a small bronze disk bearing the letters "B. C." set in the original drill hole. This mark was left in place.

**Wood** (Montana, Lincoln County; C. H. Sinclair, 1903; 1934).—On the highest knob of a wooded ridge running nearly north and south, about  $2\frac{1}{2}$  miles east of the North Fork of Yaak River and 1 mile south of the International Boundary. Since 1903 fire has swept over the station and destroyed the original stand of timber. In 1934 partial reforestation had taken place and the station was covered with a thick growth of pines about 20 feet in height. The station is easily approached from the south from the U. S. Forest Service lookout (Wood Lookout) on the south end of the mountain.

**Station mark:** In 1934 the original station mark, a drill hole in a large stone embedded in the ground, was recovered and a 3-inch bronze disk bearing the words "INTERNATIONAL BOUNDARY COMMISSION" was set in the original drill hole.

**Caribou** (Montana, Lincoln County; C. H. Sinclair, 1903; 1934).—On the highest point of Caribou Mountain, a high ridge running nearly north and south at the head waters of Gold Creek to the northeast, Caribou Creek to the southeast, and Blacktail Creek to the west. International Boundary Monument 236 is on the same ridge at a lower elevation, 0.6 mile northwest of the station.

**Station mark:** The station was recovered in 1934 and re-marked by cementing a 3-inch bronze-disk station mark, bearing the words "INTERNATIONAL BOUNDARY COMMISSION", into the original drill hole in solid rock. The three original references, an arrow cut on a large loose stone to the northeast 17 feet (paced), an arrow cut on solid rock to the south 13 feet (paced), and an arrow cut on a large loose rock to the west 8 feet (paced), were found as originally described.

**Purcell** (British Columbia, Kootenay East District; C. H. Sinclair, 1903; 1934).—On the Purcell Range, one-fourth mile north of the International Boundary and 11 miles west of Gateway, Montana; on a high peak covered with scrub pines.

**Station mark:** In 1934 the original station mark, a drill hole in solid rock, was recovered and a 3-inch bronze disk bearing the words "INTERNATIONAL BOUNDARY COMMISSION" was set in the drill hole.

**Kootenai** (British Columbia, Kootenay East District; C. H. Sinclair, 1903).—On the large, wooded summit about 10 miles northwest of Gateway, on the west side of the Kootenay River; on the highest part of the summit that rises toward the west from the precipitous east side.

**Station mark:** A drill hole in a triangular stone placed 2 feet underground. The surface mark is a drill hole in the end of an irregularly shaped stone 20 inches long set over the lower mark with a small flat stone placed between them. Three reference stones, one north and one south, marked with arrows, and one west, marked with a cross, are respectively 1.29, 2.05, and 1.42 meters from the station.

**Gateway** (British Columbia, Kootenay East District; C. H. Sinclair, 1903; 1934).—On the high knoll a short distance northeast of Gateway, Montana, about 300 meters northeast of International Boundary Monument 244. Not far north from the station are some large pines.

**Station mark:** The neck of a bottle, about 6 inches below the bottom of the surface mark, which is a block of granite, 6 by 6 by 48 inches, dressed 6 inches from the top and the remainder rough cut. A drill hole is in the center of this stone and the letters "U. S. C. B." are cut in the corners. The granite block projects about 8 inches above the ground.

**Bowdich** (Montana, Lincoln County; C. H. Sinclair, 1903; 1934).—On a high, wooded hill about one-half mile south of the International Boundary and nearly 1 mile east of the Kootenai River. This was the azimuth station mark of 1903.

**Station mark:** The neck of a bottle, about 6 inches below the bottom of the surface mark, which is a block of granite, 6 by 6 by 48 inches, dressed 6 inches from the top and the remainder rough cut. A drill hole is in the center of this stone and the letters "U. S. C. B." are cut in the corners. The granite block projects about 8 inches above the ground.

**Young** (Montana, Lincoln County; C. H. Sinclair, 1903).—On a partly grassy knoll on the west bank of the Kootenai River about  $1\frac{1}{4}$  miles south of the International Boundary, a little west and above a trail parallel to the river.

**Station mark:** The neck of a bottle, about 6 inches below the bottom of the surface mark, which is a block of granite, 6 by 6 by 48 inches, dressed 6 inches from the top and the remainder rough cut. A drill hole is in the center of this stone and the letters "U. S. C. B." are cut in the corners. The granite block projects about 8 inches above the ground.

**Gateway North Base** (Montana, Lincoln County; C. H. Sinclair, 1903; 1930).—A very short distance south of the town of Gateway, 36.2 meters west of the west rail of the Great Northern Railway, which runs nearly north and south.

**Station mark:** The underground mark is the neck of a bottle set in cement about 6 inches below the granite block used as a surface mark. The center of the mouth of the bottle is the station. The surface mark is a granite block, 12 by 12 by 48 inches, dressed 12 inches from the top and the remainder rough cut, set in concrete. This block projects 16 inches above ground. A copper bolt with cross was set for the center with the letters "U. S. C. B." cut in the stone around it. A bench-mark disk with its elevation stamped upon it was placed north of the center bolt after the stone was set.

**Baldy** (British Columbia, Kootenay East District; C. H. Sinclair, 1903; 1933).—On a high, bare, rocky peak locally called "Baldy", elevation about 8,000 feet, about 2 miles north of the falls of Phillipps Creek. Riding animals may be used as far as the Lamberton cabin on the Phillipps Creek trail and pack animals can be taken to within one-half mile of the station.

**Station mark:** Originally a drill hole in a large square rock set firmly in the ground. In 1933 the station was recovered, a copper rivet was cemented in the original drill hole, and a 4-foot cairn was erected over it.

**Wam** (Montana, Lincoln County; C. H. Sinclair, 1903).—On a bare hill, about 3 miles south of the International Boundary and south of the west fork of Wigwam River. There is no trail to the station.

**Station mark:** A drill hole in a large rock set firmly and rather low in the ground.

**Wig** (British Columbia, Kootenay East District; C. H. Sinclair, 1903; 1933).—On a high bare point on the ridge directly above and east of Wigwam River, about 2 miles north of the International Boundary.

**Station mark:** Originally a cross cut on a flat rock lying on the surface of the ground. The station was recovered in 1933, a ½-inch hole was drilled in the center of the cross, a copper nail was cemented in the hole, and a triangle was cut in the rock around it.

**Canada** (British Columbia, Kootenay East District; E. C. Barnard, 1903).—On a sharp limestone peak, the highest point in the immediate vicinity; precipitous on the east and only approachable from the west; about 4½ miles north of the International Boundary, and at the head of a large creek flowing into the Flathead River from the west, 3 miles above the boundary. It can be best reached by following up this creek, keeping to the right at each fork and following the second right-hand fork to its head in a low saddle. After passing this, cross to the first ridge running east and west, and go up this to the eastward to the summit of the peak.

**Station mark:** A ½-inch drill hole surrounded by a triangle in a lime rock 12 by 15 by 18 inches, firmly set in the ground, over which is a 4-foot cairn.

**Hefty** (Montana, Flathead County; E. C. Barnard, 1903; 1933).—On Hefty Mountain the highest point of a ridge about 4½ miles west of the Flathead River where it crosses the International Boundary, about one-fourth mile south of Monument 259. The station may be reached with horses from a trail which crosses the ridge a few meters north of the boundary near Monument 259.

**Station mark:** A drill hole with a triangle around it and the letters "U. S.", cut in a smooth flat stone 12 by 12 by 5 inches, placed with its surface flush with the ground. In 1933 a copper rivet was cemented into the drill hole.

**Kishenehn** (British Columbia, Kootenay East District; E. C. Barnard, 1903; 1933).—On the highest point of Mount Yarrell, the first peak east of the Flathead River on the northwest side of Kishenehn Creek; about 4½ miles northeast of where the International Boundary crosses Kishenehn Creek.

**Station mark:** Originally a drill hole in an outcropping ledge of red shale having a dip of about 45° to the south. When the station was recovered in 1933 the rock around it was found badly shattered and the drill hole all but obliterated. A ½-inch cold-chisel was found driven into the hole; this was left in place and a small cairn erected over it.

**Kintla** (Montana, Flathead County; E. C. Barnard, 1903; U. S. Coast and Geodetic Survey, 1925).—On the high, sharp, summit of Parke Peak in Glacier National Park, about 7 miles east of the Flathead River and about 1¼ miles south of the east end of Lower Kintla Lake.

**Station mark:** Originally a drill hole in a rock with a cairn built over it. The U. S. Coast and Geodetic Survey recovered the station in 1925, held the original mark, and placed a bronze wedge with a cross cut on it in a small cavity in solid rock 2 feet below the surface. They then replaced the original surface mark with one of their standard bronze-disk station marks set in a drill hole in a rock 7 by 12 by 24 inches in size. They also set two reference marks in rock outcrop but give no description of them.

**Starvation** (British Columbia, Kootenay East District; E. C. Barnard, 1903).—Near the north end of the northernmost of two peaks at the head of the north fork of Starvation Creek. A trail is cut to the basin head where wood, water, and grass are to be had for camping.

Station mark: A drill hole in the outcropping ledge, with a stone pile over it.

**North Divide** (British Columbia, Kootenay East District; Alberta, Macleod District; E. C. Barnard, 1903, 1933).—On the highest point of Mount Festubert, on the main divide of the Rocky Mountains between the north and the south forks of Kishenehn Creek. The old Alberta Trail goes up the north fork and a new trail up the south fork to a lower summit.

Station mark: A drill hole in a red stone about 4 by 5 by 15 inches, placed over a drill hole in the outcropping ledge, which is soft and shaly and has a dip of about 20° to the southwest. In 1933 a 5-foot cairn was found over the mark; this was left in place.

**South Divide** (Montana, Flathead and Glacier Counties; E. C. Barnard, 1903; 1909).—On the first peak; south of the International Boundary, of the main divide of the Rocky Mountains. The station is about one-half mile south of Monument 272.

Station mark: A drill hole in rock ledge with a stone pile over it; there are three other stone piles nearby.

**Waterton** (Alberta, Lethbridge District; C. H. Sinclair, 1909).—About 2¼ miles west of Waterton Lake and 2 miles north of Boundary Creek, on a peak which breaks vertically to the northwest and southeast. A small lake lies one-half mile to the northwestward.

Station mark: A cairn over a drill hole in rock in place.

**Campbell S. W.** (Montana, Glacier County; C. H. Sinclair, 1909).—In Glacier National Park, on the middle and highest peak of Mount Campbell. The station is 1½ miles west of Waterton Lake and 1 mile south of Boundary Creek, on the northeast tip of the peak. A narrow ridge extends about one-half mile southeastward.

Station mark: A cairn over a drill hole in rock in place.

**Sofa** (Alberta, Lethbridge District; C. H. Sinclair, 1909).—About 2 miles north of the International Boundary and 5 miles west of Belly River, on the northeast end of the ridge overlooking the Belly River valley to the east and the plains to the north. The station is on the highest summit. The summit has a rounded top and no solid ledges.

Station mark: A cairn over a drill hole in a rock.

**Belly** (Montana, Glacier County; C. H. Sinclair, 1909).—About 3 miles south of the International Boundary and 3½ miles west of Belly River, on the northwest summit of the ridge northeast of Glens Lake.

Station mark: A cairn over a drill hole in a red sandstone ledge.

**Rim** (Alberta, Lethbridge District; C. H. Sinclair, 1909; 1921).—About 1½ miles north of the International Boundary and 2 miles northwest of Lee Creek. The station is on the south edge of a flat-topped ridge about 3 miles long and is nearly 1 mile northeast of the summit of the mountain. The whole mountain is wooded.

Station mark: A drill hole in a rock nearly flush with the ground.

**Chief Mountain** (Montana, Glacier County; U. S. Geological Survey, 1901; 1909).—On the summit of Chief Mountain, a prominent mountain, 4½ miles south of the International Boundary and on the line between the Blackfeet Indian Reservation and Glacier National Park.

Station mark: The U. S. G. S. station mark is an aluminum disk stamped "9056", cemented in solid rock. A 6-foot cairn marking the turning point on the Blackfeet Indian Reservation—Glacier Park boundary stands 0.79 meter from the station mark in azimuth 314°. This boundary cairn was used as the station in 1909 by the International Boundary Commission and the geographic position given in this publication is that of the cairn.

**Pike** (Montana, Glacier County; C. H. Sinclair, 1909; 1921).—In the Blackfeet Indian Reservation, about 1½ miles southwest of Pike Lake. The station is in NE¼ sec. 17, T. 37 N., R. 14 W., principal meridian; about 200 meters south of the northeast corner of the section.

Station mark: A drill hole with a triangle in a white rock; subsurface mark, a bronze disk set about 1 foot underground.

**Police** (Alberta, Lethbridge District; C. H. Sinclair, 1909; 1921).—In NE¼ sec. 7, T. 1, R. 26 W., fourth meridian. It is on a knoll about one-half mile north of Outpost Lake.

Station mark: A cairn over a drill hole in a granite ledge projecting about 1 foot above the ground. The reference marks are: A stone 25.6 meters from the station in azimuth 80°; a stone 17.4 meters from the station in azimuth 160°; and a boulder 29 meters from the station in azimuth 210°. On each stone is cut an arrow pointing toward the station.

**St. Mary** (Alberta, Lethbridge District; C. H. Sinclair, 1909).—In NW¼ sec. 7, T. 1, R. 25 W., fourth meridian; on a knoll near the west boundary, and about 100 meters south of the north boundary of the quarter section. The station is about 37.6 meters east of the road fence. The road allowance is too steep to be used as a roadway, but the fences are in place.

Station mark: A bronze disk set in a small stone. The reference marks are 3 stones—one 16.6 meters to the northeast; one 31.6 meters to the northwest; and one 16.5 meters to the southwest or southeast. Each stone is marked by an arrow pointing toward the station.

**Spider** (Montana, Glacier County; C. H. Sinclair, 1909; 1921).—In the Blackfeet Indian Reservation, near the center of SW¼ sec. 16, T. 37 N., R. 13 W., principal meridian. The station is on the most southern of the high points on the first ridge east of St. Mary River and about one-half mile north of Spider Lake.

Station mark: A drill hole in a granite ledge. The reference marks are 3 rocks—one 12.8 meters to the southwest; one 7.9 meters to the northwest; and one 7.7 meters to the southeast.

**St. Mary North Base** (Montana, Glacier County; O. B. French, 1912).—In the Blackfeet Indian Reservation, in NW¼ sec. 1, T. 37 N., R. 14 W., principal meridian. The station is about 350 meters southeast of the intersection of the roads on the south and east sides of sec. 3 on the Canadian side of the International Boundary. Monument 290 is about 250 meters west of the road intersection.

Station mark: A bronze disk set in a boulder projecting about 3 inches above the ground and a subsurface boulder 10 inches below the upper one, with the center marked by a cross.

**St. Mary South Base** (Montana, Glacier County; O. B. French, 1912; 1921).—In the Blackfeet Indian Reservation, on the highest hill in the locality; about 2 miles south of International Boundary Monument 290. The station is in NW¼ sec. 13, T. 37 N., R. 14 W., principal meridian, about 100 meters from the north boundary of the section and 200 meters west of the mid-section line. The main road northward from Babb is about one-half mile to the west.

Station mark: A cross on a boulder. The subsurface mark is a boulder 11 inches below the upper one, with the center also marked by a cross.

**373-S** (Montana, Glacier County; C. H. Sinclair, 1909; 1921).—In the Blackfeet Indian Reservation, on the high ridge east of the road that crosses the International Boundary north of Peskan; nearly 1 mile from the road and 1½ miles north of Peskan. The station is near the northwest corner of NW¼ sec. 5, T. 37 N., R. 12 W., principal meridian. Monument 295 is 50.5 meters northeast of the station.

Station mark: A drill hole in a quartz ledge.

**Milk** (Alberta, Lethbridge District; C. H. Sinclair, 1909; 1921).—On a high hill about 2 miles northwest of the junction of the road that crosses the International Boundary near Monument 301, with the road that parallels the North Fork of Milk River on the United States side of the boundary. The station is about 400 meters southwest from where the road crosses the saddle of the ridge. It is in SE¼ sec. 6, T. 1, R. 23 W., fourth meridian.

Station mark: A drill hole in a granite boulder, referenced by three boulders—one 7.04 meters to the northwest; one 16.95 meters to the northeast; and one 7.89 meters to the southeast.

**Lincoln** (Montana, Glacier County; U. S. Geological Survey, 1901; International Boundary Commission, 1909; U. S. Coast and Geodetic Survey, 1923).—The station is 3.41 meters from station "Mussetter" in azimuth 60°19' 53". (See description of "Mussetter".)

Station mark: A standard U. S. G. S. bench-mark post set 3 feet in the ground and projecting 1 foot above the ground.

**New** (Montana, Glacier County; C. H. Sinclair, 1910).—In the Blackfeet Indian Reservation, on a plateau about 2¼ miles south of the International Boundary and 5 miles east of the North Fork of Milk River. The station is in SE¼ sec. 17, T. 37 N., R. 10 W., principal meridian. A road from Browning, Montana, crosses the plateau about 100 meters east of the station, and about 300 meters to the westward the ground slopes steeply toward the river valley.

Station mark: A cairn over a bronze disk set in concrete.

**Bunch** (Alberta, Lethbridge District; C. H. Sinclair, 1910; 1921).—On the high bench about 2 miles east of the North Fork of Milk River and a little over one-half mile north of the International Boundary. The station is in NW¼ sec. 6, T. 1, R. 22 W., fourth meridian; about 15 meters east of the abrupt edge of the bench.

Station mark: A drill hole in a small boulder embedded in the sod, with other small boulders around it.

**Gap** (Montana, Glacier County; C. H. Sinclair, 1910).—In the Blackfeet Indian Reservation, in NE¼ sec. 9, T. 37 N., R. 10 W., principal meridian. The station is on a low hill about 1 mile south of International Boundary Monument 304 and nearly 3½ miles east of the North Fork of Milk River. At the station the hill drops off to the north; to the west and south it is nearly level.

Station mark: A cairn over a bronze disk set in concrete.

**Ridge** (Montana, Glacier County; C. H. Sinclair, 1910; 1921).—In the Blackfeet Indian Reservation, in NE¼ sec. 11, T. 37 N., R. 10 W., principal meridian. The station is on the southeast end of a ridge 1 mile south of International Boundary Monument 305.

Station mark: A cairn over a bronze disk set in concrete.

**Bluff** (Alberta, Lethbridge District; C. H. Sinclair, 1910).—Near the center of sec. 10, T. 1, R. 22 W., fourth meridian. The station is on a grassy flat-topped hill about  $1\frac{1}{2}$  miles north of the International Boundary between Monuments 305 and 306.

Station mark: A drill hole in a rock set in the ground.

**Center** (Montana, Glacier County; C. H. Sinclair, 1910; 1921).—In the Blackfeet Indian Reservation, in SE $\frac{1}{4}$  sec. 3, T. 37 N., R. 9 W., principal meridian. The station is on the same plateau about three-fourths mile southwest of International Boundary Monument 309 and is about 200 meters north and 300 meters west of the boundary lines of the section. The plateau breaks about 300 meters to the south and to the east.

Station mark: A cairn over a drill hole in a rock.

**South** (Montana, Glacier County; C. H. Sinclair, 1910).—In the Blackfeet Indian Reservation, in SW $\frac{1}{4}$  sec. 24, T. 37 N., R. 9 W., principal meridian. The station is about 100 meters south of the midsection line and 300 meters from the west boundary of the section, on the highest and most eastern of four small humps about one-half mile south of the South Fork of Milk River.

Station mark: A cairn over a drill hole in a rock.

**Table** (Alberta, Lethbridge District; C. H. Sinclair, 1910).—In SE $\frac{1}{4}$  sec. 12, T. 1, R. 21 W., fourth meridian. The station is about 2 miles east of the east end of the plateau lying between the North and South Forks of Milk River, on a flat-topped knoll, about 150 meters from the east and 250 meters from the south boundary of the section.

Station mark: Not given.

**Bend** (Montana, Glacier County; C. H. Sinclair, 1910).—In the Blackfeet Indian Reservation. The station is about 2 miles south of the International Boundary, in SW $\frac{1}{4}$  sec. 10, T. 37 N., R. 8 W., principal meridian, and is on the east bank of the South Fork of Milk River, on a prominent butte near the south end of a ridge which slopes gradually to the east and shows a bluff on the river side. The river takes a sharp bend to the south, northwest of the station.

Station mark: A wrought iron bench-mark post with a brass top, projecting about 1 foot above the ground.

**River** (Alberta, Lethbridge District; C. H. Sinclair, 1910).—About  $1\frac{1}{2}$  miles west of the South Fork of Milk River and 3 miles northwest of the intersection of the river with the International Boundary. The station is in NW $\frac{1}{4}$  sec. 14, T. 1, R. 20 W., fourth meridian, about 100 meters south of the north boundary of the section and the same distance west of the midsection line, and a little west of the highest part of the highest of a series of knolls.

Station mark: A drill hole in quartz rock flush with the ground.

**Antelope** (Montana, Glacier County; C. H. Sinclair, 1910).—In the Blackfeet Indian Reservation. The station is about 2 miles south of International Boundary Monument 317; in NE $\frac{1}{4}$  sec. 14, T. 37 N., R. 7 W., principal meridian, roughly 200 meters from the north boundary of the section and 50 meters from the midsection line, and on the highest part of a ridge lying east and west.

Station mark: A chiseled cross in a granite boulder, flush with the ground.

**Line** (Montana, Glacier County; C. H. Sinclair, 1910).—In the Blackfeet Indian Reservation, a little over one-half mile southwest of International Boundary Monument 320. The station is near the middle of SW $\frac{1}{4}$  sec. 4, T. 37 N., R. 6 W., principal meridian, on the highest part of a flat-topped knoll to the west of a large plateau. A number of large rocks are scattered around the station, which is 6.58 meters north of the largest rock.

Station mark: A cross on a rock.

**Foot** (Alberta, Lethbridge District; C. H. Sinclair, 1910).—On a small knoll about  $2\frac{1}{2}$  miles north of International Boundary Monument 320, in SE $\frac{1}{4}$  sec. 18, T. 1, R. 18 W., fourth meridian, and about 200 meters from each of the midsection lines.

Station mark: A cairn over a cross on a flat rock.

**Clear** (Montana, Glacier County; C. H. Sinclair, 1910).—About  $1\frac{1}{2}$  miles south of International Boundary Monument 321 and a little more than one-half mile east of the fence marking the east boundary of the Blackfeet Indian Reservation. The station is on a rounded butte in SE $\frac{1}{4}$  sec. 11, T. 37 N., R. 6 W., principal meridian. Two small lakes lie south of the butte.

Station mark: A stone pile.

**Lake** (Alberta, Lethbridge District; C. H. Sinclair, 1910).—About  $2\frac{1}{2}$  miles north of International Boundary Monument 323, in SW $\frac{1}{4}$  sec. 13, T. 1, R. 18 W., fourth meridian, close to the west boundary of the section. The station is about 90 meters south of the highest western point of the ridge.

Station mark: A drill hole and triangle in a granite boulder, flush with the ground; a red granite boulder about 90 meters to the north, on the highest part of the ground, is similarly marked.

**Corner** (Montana, Glacier County; C. H. Sinclair, 1910).—About 2 miles south of International Boundary Monument 323; in NW¼ sec. 17, T. 37 N., R. 5 W., principal meridian; on a prominent point showing as part of a ridge viewed from the north.

**Station mark:** A stone pile over a drill hole in a sandstone boulder flush with the ground, 8.3 meters west of a cairn.

**Horse** (Alberta, Lethbridge District; C. H. Sinclair, 1910).—About 2 miles north of International Boundary Monument 324; in SE¼ sec. 18, T. 1, R. 17 W., fourth meridian, about 100 meters from the south boundary of the section. The station is on a knoll about one-half mile north of a deep coulee which is a branch of Red Creek.

**Station mark:** A drill hole three-fourths inch deep in a granite boulder showing a pyramidal top nearly flush with the ground.

**Cairn** (Montana, Toole County; C. H. Sinclair, 1910; 1921).—About 2 miles south of International Boundary Monument 327; in NW¼ sec. 17, T. 37 N., R. 4 W., principal meridian. The station is on the highest point of a low flat-topped ridge lying approximately north and south.

**Station mark:** A drill hole and triangle cut in a granite boulder nearly flush with the ground, referenced by three granite boulders, each with an arrow pointing toward the station. The first is 49.5 meters from the station in azimuth 147°34'; the second is 10.8 meters from the station in azimuth 254°20'; the third is 10.5 meters from the station in azimuth 306°29'.

**Red** (Alberta, Lethbridge District; C. H. Sinclair, 1910; 1921).—About one-half mile northeast of International Boundary Monument 328; in the southeast corner of NE¼ sec. 6, T. 1, R. 16 W., fourth meridian. The station is on a hill 200 meters east of the road that crosses the boundary near Monument 328.

**Station mark:** A drill hole in rock near a cairn.

**Crook** (Alberta, Lethbridge District; C. H. Sinclair, 1910).—About 1½ miles northeast of International Boundary Monument 330; in the northwest corner of SW¼ sec. 11, T. 1, R. 16 W., fourth meridian. The station is on the south bank of Red Creek, where the creek makes a decided bend.

**Station mark:** A drill hole and triangle cut in a granite boulder.

**Cliff** (Montana, Toole County; C. H. Sinclair, 1910; 1921).—About 1½ miles southeast of International Boundary Monument 330; in sec. 7, T. 37 N., R. 3 W., principal meridian, about 200 meters east and slightly north of the middle of the section. The station is about 600 meters south of the road crossing Buckeye Coulee, on a ridge lying north and south.

**Station mark:** A cairn over a drill hole in a flat rock.

**Peg** (Alberta, Lethbridge District; C. H. Sinclair, 1910).—About one-third mile southwest of the west end of the dry lake bed that lies 1 mile west along the road from Coutts. The station is about one-half mile northeast of International Boundary Monument 332; in SW¼ sec. 5, T. 1, R. 15 W., fourth meridian. It is on a rise of ground close to the west boundary of the section.

**Station mark:** A drill hole and triangle in a granite boulder nearly flush with the ground.

**Coutts Northwest Base** (Alberta, Lethbridge District; C. H. Sinclair, 1910).—About 2 miles northwest of Coutts, near the Canadian Pacific Railway; in SE¼ sec. 7, T. 1, R. 15 W., fourth meridian. The station is 11.24 meters south of the south side of the south rail of the track at a point marked by a cross filed on the top of the rail at or near the beginning of the curve to the northward.

**Station mark:** A bronze disk set in a block of concrete 2 feet deep in the ground.

**Coutts Southeast Base** (Alberta, Lethbridge District; C. H. Sinclair, 1910; 1917).—About 1½ miles northwest of Coutts, near the Canadian Pacific Railway; in NW¼ sec. 5, T. 1, R. 15 W., fourth meridian. The station is 11.24 meters from a cross filed on the top of the rail, and at right angles to the outer edge of the rail. It is 17.72 meters southeast of the point of the frog of the switch.

**Station mark:** A bronze disk, set in a block of concrete 2 feet deep in the ground.

**Center I** (Alberta, Lethbridge District; J. J. McArthur, 1908; 1917).—About 2 miles east of Coutts; in SW¼ sec. 2, T. 1, R. 15 W., fourth meridian. The station is on a gravel knoll 258 meters north of International Boundary Monument 336. A gravel pit was found in 1917 close to this station; it may have been destroyed at any time since then.

**Station mark:** A bronze disk set in a boulder about 14 inches in diameter.

**Coffin** (Alberta, Medicine Hat District; J. J. McArthur, 1908).—About 3½ miles north of International Boundary Monument 338; in SW¼ sec. 19, T. 1, R. 14 W., fourth meridian. The station is on the highest point north of the Coutts-Police Coulee road, roughly 5 miles northeast of Coutts.

**Station mark:** A bronze disk set in a rock.



**Griffith** (Montana, Toole County; J. J. McArthur, 1908).—About  $1\frac{1}{4}$  miles south of the International Boundary midway between Monuments 338 and 339; in SE $\frac{1}{4}$  sec. 10, T. 37 N., R. 2 W., principal meridian; close to the south boundary of the section and about midway between the east boundary and the midsection line. The station is on the most southern isolated knob in the vicinity.

Station mark: A bronze disk set in a boulder.

**Ashe** (Alberta, Medicine Hat District; J. J. McArthur, 1908).—About 4 miles due north of International Boundary Monument 341; in SE $\frac{1}{4}$  sec. 26, T. 1, R. 14 W., fourth meridian. The station is two or three hundred meters from the east boundary of the section and from the midsection line.

Station mark: A bronze disk set in a boulder.

**Sheep** (Montana, Toole County; J. J. McArthur, 1910).—About  $2\frac{1}{4}$  miles south of International Boundary Monument 342; in SE $\frac{1}{4}$  sec. 16, T. 37 N., R. 1 E., principal meridian. The station is close to the east boundary of the section and about 200 meters south of the midsection line.

Station mark: Not described.

**Center II** (Montana, Toole County; J. J. McArthur, 1908).—About  $1\frac{1}{4}$  miles south of International Boundary Monument 343; in SW $\frac{1}{4}$  sec. 11, T. 37 N., R. 1 W., principal meridian. The station is on the highest part of the ridge, close to the east-and-west midsection line and about 200 meters from the north-and-south midsection line.

Station mark: A bronze disk set in a boulder.

**Milk** (Alberta, Medicine Hat District; J. J. McArthur, 1908).—About  $4\frac{1}{2}$  miles north of International Boundary Monument 346. The station is in SE $\frac{1}{4}$  sec. 30, T. 1, R. 12 W., fourth meridian, on a high east-and-west ridge near the middle of the section.

Station mark: A bronze disk set in a boulder.

**Mountain** (Montana, Toole County; J. J. McArthur, 1908).—About 1 mile south of International Boundary Monument 348. The station is in NW $\frac{1}{4}$  sec. 12, T. 37 N., R. 1 E., principal meridian, on the most northern spur of the Sweet Grass Hills.

Station mark: A bronze disk set in a rock.

**Center III** (Alberta, Medicine Hat District; J. J. McArthur, 1908; 1917).—In SW $\frac{1}{4}$  sec. 5, T. 1, R. 11 W., fourth meridian. The station is 633 meters north of International Boundary Monument 351, on the highest point in the vicinity.

Station mark: A drill hole in a rock in place.

**Roscoe** (Montana, Toole County; J. J. McArthur, 1908).—About  $3\frac{1}{4}$  miles south of International Boundary Monument 355. The station is near the center of sec. 22, T. 37 N., R. 3 E., principal meridian; on the highest part of the east-and-west ridge.

Station mark: A bronze disk set in a boulder.

**Breed** (Alberta, Medicine Hat District; J. J. McArthur, 1908).—About 3 miles north of International Boundary Monument 355; in NW $\frac{1}{4}$  sec. 17, T. 1, R. 10 W., fourth meridian; about 100 meters from the north boundary and 500 meters from the west boundary of the section. The station is on the highest point of the ridge west of Breed Creek.

Station mark: A bronze disk set in a boulder.

**Center IV** (Montana, Liberty County; J. J. McArthur, 1908; 1917).—About one-half mile southwest of International Boundary Monument 359; in SE $\frac{1}{4}$  sec. 3, T. 37 N., R. 4 E., principal meridian, about 100 meters from the east boundary of the section. The station is on the most western spur of the hill.

Station mark: A bronze disk set in a boulder.

**Bear** (Alberta, Medicine Hat District; J. J. McArthur, 1908).—About  $1\frac{1}{4}$  miles north of International Boundary Monument 360; in NE $\frac{1}{4}$  sec. 9, T. 1, R. 9 W., fourth meridian, about 400 meters from the east boundary of the section, and 100 meters from the midsection line. The station is on the highest part of the ridge.

Station mark: A bronze disk set in a boulder.

**East Butte** (Montana, Liberty County; J. J. McArthur, 1908).—About 7 miles south of the International Boundary; in SW $\frac{1}{4}$  sec. 6, T. 36 N., R. 5 E., principal meridian. The station is on the most northern spur of East Butte.

Station mark: A bronze disk set in rock.

**Center V** (Montana, Liberty County; J. J. McArthur, 1908; 1917).—About one-half mile southeast of International Boundary Monument 363; in NE $\frac{1}{4}$  sec. 2, T. 37 N., R. 5 E., principal meridian. The station is on the highest part of the east end of the hill.

Station mark: A bronze disk set in a boulder.

**Laird** (Montana, Liberty County; J. J. McArthur, 1908).—About  $5\frac{1}{4}$  miles south of International Boundary Monument 364; in NW $\frac{1}{4}$  sec. 36, T. 37 N., R. 5 E., principal meridian. The station is on the highest part of the east-and-west ridge.

Station mark: A bronze disk set in a rock.

**Kop** (Alberta, Medicine Hat District; J. J. McArthur, 1908).—About 2 miles north of International Boundary Monument 364; in the northwest corner of NW $\frac{1}{4}$  sec. 10, T. 1, R. 8 W., fourth meridian. The station is on a prominent hill.

Station mark: A bronze disk set in rock.

**Lost** (Alberta, Medicine Hat District; J. J. McArthur, 1908).—About  $1\frac{1}{4}$  miles northwest of International Boundary Monument 368; in NE $\frac{1}{4}$  sec. 5, T. 1, R. 7 W., fourth meridian. The station is on the high part of the east end of the ridge and about one-half mile west of Lost Creek.

Station mark: A bronze disk set in a boulder.

**Center VII** (Montana, Liberty County; J. J. McArthur, 1908).—About 1 mile southeast of International Boundary Monument 370; in NE $\frac{1}{4}$  sec. 9, T. 37 N., R. 7 E., principal meridian. The station is on the highest part of the ridge at the north boundary of the section.

Station mark: A bronze disk set in a boulder.

**Christianson** (Montana, Hill County; J. J. McArthur, 1908).—About  $4\frac{1}{2}$  miles south of International Boundary Monument 379; in SW $\frac{1}{4}$  sec. 26, T. 37 N., R. 9 E., principal meridian; on the highest point.

Station mark: A bronze disk set in a boulder.

**Bar 5** (Alberta, Medicine Hat District; J. J. McArthur, 1908).—About 4 miles north of International Boundary Monument 380; in the northeast corner of NE $\frac{1}{4}$  sec. 20, T. 1, R. 4 W., fourth meridian. The station is on the noticeably high point west of the Lost River valley.

Station mark: A bronze disk set in a boulder.

**Center IX** (Montana, Hill County; J. J. McArthur, 1908).—In NE $\frac{1}{4}$  sec. 3, T. 37 N., R. 10 E., principal meridian; about 300 meters south of the International Boundary, midway between Monuments 382 and 383. The station is about  $1\frac{1}{4}$  miles east of Milk River, on the hill near the boundary.

Station mark: A bronze disk set in a boulder.

**Blacktail** (Alberta, Medicine Hat District; J. J. McArthur, 1908).—About 4 miles north of International Boundary Monument 383; in SW $\frac{1}{4}$  sec. 29, T. 1, R. 3 W., fourth meridian. The station is on a noticeably high point.

Station mark: A bronze disk set in a boulder.

**Pugsley and Simpson** (Montana, Hill County; J. J. McArthur, 1908).—About 2 miles south of International Boundary Monument 385; in SE $\frac{1}{4}$  sec. 7, T. 37 N., R. 11 E., principal meridian. The station is on the highest part of the ridge.

Station mark: A bronze disk set in a boulder.

**Center X** (Alberta, Medicine Hat District; J. J. McArthur, 1908).—About 2 miles north of the International Boundary midway between Monuments 385 and 386; in NE $\frac{1}{4}$  sec. 11, T. 1, R. 3 W., fourth meridian, close to the north boundary of the section and about 200 meters from the midsection line. The station is on an isolated hill.

Station mark: A bronze disk set in a boulder.

**Hat** (Alberta, Medicine Hat District; J. J. McArthur, 1908).—About  $4\frac{1}{4}$  miles north of International Boundary Monument 391; in SW $\frac{1}{4}$  sec. 29, T. 1, R. 1 W., fourth meridian. The station is on the highest point in the vicinity.

Station mark: A bronze disk set in a boulder.

**Toledo** (Montana, Hill County; J. J. McArthur, 1909).—About  $5\frac{1}{4}$  miles south of International Boundary Monument 395; in NW $\frac{1}{4}$  sec. 35, T. 37 N., R. 13 E., principal meridian. The station is on the highest part of the east-and-west ridge.

Station mark: A bronze disk set in a boulder.

**Day** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About  $4\frac{1}{2}$  miles north of International Boundary Monument 395; in SW $\frac{1}{4}$  sec. 29, T. 1, R. 30 W., third meridian. The station is on the highest part of the east-and-west ridge.

Station mark: A bronze disk set in a boulder.

**Center XI** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About  $1\frac{1}{2}$  miles north of the International Boundary midway between Monuments 398 and 399; in E $\frac{1}{2}$  sec. 7, T. 1, R. 29 W., third meridian, close to the east-and-west midsection line. The station is on a hill north of a depression near the boundary.

Station mark: A bronze disk set in a boulder.

**Willow Creek** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 6 miles north of International Boundary Monument 400; in NW¼ sec. 34, T. 1, R. 29 W., third meridian. The station is on a prominent ridge east of Lodge Creek.

Station mark: A bronze disk set in a boulder.

**Chinook** (Montana, Hill County; J. J. McArthur, 1908).—See description of station "Signal."

**Center XII** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 2½ miles northeast of International Boundary Monument 402; in SW¼ sec. 18, T. 1, R. 28 W., third meridian. The station is about 1½ miles northeast of the Royal Canadian Mounted Police post on Lodge Creek.

Station mark: A bronze disk set in a boulder.

**Police** (Montana, Hill County; J. J. McArthur, 1909; 1912).—About 4½ miles south of International Boundary Monument 404; in SE¼ sec. 30, T. 37 N., R. 16 E., principal meridian. The station is on a prominent knoll about 100 meters east of Lodge Creek.

Station mark: A bronze disk set in a boulder.

**Maple** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 6½ miles north of International Boundary Monument 405; in SE¼ sec. 2, T. 2, R. 28 W., third meridian. The station is close to the east end of a trail.

Station mark: A bronze disk set in a boulder.

**Kirk** (Montana, Hill County; J. J. McArthur, 1909; 1912).—About 4¼ miles south of International Boundary Monument 408; in NE¼ sec. 25, T. 37 N., R. 16 E., principal meridian. The station is on the east side of the top of the divide between Hay Coulee and the West Fork of Milk River.

Station mark: A bronze disk set in a boulder.

**Kirk North Base** (Montana, Hill County; O. B. French, 1912).—About 2¼ miles south of the International Boundary midway between Monuments 406 and 407; close to the line between secs. 14 and 15, T. 37 N., R. 16 E., principal meridian, and about one-fourth mile from the north boundary of the sections. The station is on the divide between Hay Coulee and the west Fork of Milk River.

Station mark: A bronze disk set in a boulder, and a boulder marked by a cross 12 inches underground, directly under the surface mark.

**Kirk South Base** (Montana, Hill County; O. B. French, 1912).—About 4¼ miles south of International Boundary Monument 407; near the midsection line of sec. 26, T. 37 N., R. 16 E., principal meridian. The station is on a small knoll.

Station mark: A bronze disk set in a boulder, and a boulder marked by a cross 10 inches underground and directly under the surface mark.

**Todd** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 4½ miles north of International Boundary Monument 408; near the center of sec. 27, T. 1, R. 27 W., third meridian. The station is on a noticeably high point west of Woodpile Coulee.

Station mark: A bronze disk set in a boulder.

**Center XIII** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909; 1917).—About 1½ miles north of International Boundary Monument 410; in SW¼ sec. 12, T. 1, R. 27 W., third meridian. The station is on the highest point between Woodpile Coulee and the East Fork of Milk River.

Station mark: Probably a bronze disk set in a boulder.

**Link** (Montana, Blaine County; J. J. McArthur, 1909).—About 4 miles south of International Boundary Monument 415; near the north end of the boundary between secs. 27 and 28, T. 37 N., R. 18 E., principal meridian. The station is on the highest part of the north-and-south ridge.

Station mark: A bronze disk set in a boulder.

**Shep** (Montana, Blaine County; J. J. McArthur, 1909).—About one mile south of International Boundary Monument 415; in NE¼ sec. 9, T. 37 N., R. 18 E., principal meridian; on a high point near the north boundary of the section.

Station mark: A bronze disk set in a boulder.

**Ryder** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 2¼ miles north of International Boundary Monument 415; in NW¼ sec. 13, T. 1, R. 26 W., third meridian. The station is on a noticeable elevation.

Station mark: A bronze disk set in a boulder.

**318** (Montana, Blaine County; U. S. Geological Survey; International Boundary Commission, 1909).—Near the north boundary of NE¼ sec. 6, T. 37 N., R. 19 E., principal meridian; about 2.7 meters south of International Boundary Monument 418.

Station mark: A bench-mark pipe.

**Strong** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 200 meters east of the middle of sec. 33, T. 1, R. 24 W., third meridian.

Station mark: A bronze disk set in a boulder.

**Center XIV** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 250 meters north of the International Boundary and one-half mile west of Monument 439; in SE¼ sec. 5, T. 1, R. 20 W., third meridian. The station is on the highest part of the hill.

Station mark: A bronze disk set in a boulder.

**Murray** (Montana, Blaine County; J. J. McArthur, 1909).—About 2¼ miles south of International Boundary Monument 440; in NE¼, sec. 17, T. 37 N., R. 24 E., principal meridian. The station is near the middle of the quarter section.

Station mark: A bronze disk set in a boulder.

**Telford** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 5 miles north of International Boundary Monument 440; in NW¼ sec. 26, T. 1, R. 20 W., third meridian. The station is on a high ridge.

Station mark: A bronze disk set in a boulder.

**Avery** (Montana, Blaine County; J. J. McArthur, 1909).—About 1¼ miles southeast of International Boundary Monument 446; in NW¼ sec. 11, T. 37 N., R. 25 E., principal meridian. The station is on the highest and most eastern part of an isolated hill.

Station mark: A bronze disk set in a boulder.

**Tees** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 3¼ miles north of International Boundary Monument 447; in NE¼ sec. 19, T. 1, R. 18 W., third meridian. The station is about 200 meters from the north-and-south, and about 300 meters from the east-and-west, midsection lines.

Station mark: A bronze disk set in a boulder.

**Harding** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 3 miles north of International Boundary Monument 449; in SW¼ sec. 23, T. 1, R. 18 W., third meridian. The station is about 200 meters from the south boundary of the section and about 100 meters from the midsection line.

Station mark: A bronze disk set in a boulder.

**Betts** (Montana, Blaine County; J. J. McArthur, 1909).—About 2 miles south of International Boundary Monument 449; in NE¼ sec. 16, T. 37 N., R. 26 E., principal meridian. The station is on the highest point in the vicinity.

Station mark: A bronze disk set in a boulder.

**Raley** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 4½ miles north of International Boundary Monument 452; in SW¼ sec. 27, T. 1, R. 17 W., third meridian. The station is about 300 meters from each of the midsection lines.

Station mark: A bronze disk set in a boulder.

**White** (Montana, Phillips County; J. J. McArthur, 1909).—About 3 miles south of International Boundary Monument 452; in SE¼ sec. 17, T. 37 N., R. 27 E., principal meridian. The station is on the highest part of the ridge.

Station mark: A bronze disk set in a boulder.

**Cole** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 4½ miles north of the International Boundary, midway between Monuments 456 and 457; in SE¼ sec. 27, T. 1, R. 16 W., third meridian. The station is on the highest point east of Whitewater Creek.

Station mark: A bronze disk set in a boulder.

**Snow** (Montana, Phillips County; J. J. McArthur, 1909).—About 4¼ miles south of International Boundary Monument 457; in SE¼ sec. 28, T. 37 N., R. 28 E., principal meridian. The station is about 200 meters from the east boundary of the section, and about midway between the south boundary and the midsection line.

Station mark: A bronze disk set in a boulder.

**Cory** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About 4¼ miles north of International Boundary Monument 463; in SW¼ sec. 29, T. 1, R. 14 W., third meridian. The station is on the highest point in the vicinity.

Station mark: A bronze disk set in a boulder.

**Kerr** (Montana, Phillips County; J. J. McArthur, 1909; 1912).—Nearly 1 mile south of International Boundary Monument 463; in SE¼ sec. 1, T. 37 N., R. 29 E., principal meridian. The station is on the approximately central knoll of several about 1 mile east of the northeast fork of Whitewater Creek; this knoll has a larger and

flatter top than most of the others. About 100 meters to the northeast is a knoll with a prominent white boulder on its top.

Station mark: A bronze disk set in a boulder.

**Sowers** (Montana, Phillips County; J. J. McArthur, 1909; 1912).—About  $1\frac{1}{4}$  miles south of International Boundary Monument 466; in NE $\frac{1}{4}$  sec. 10, T. 37 N., R. 30 E., principal meridian. The station is on a prominent knoll south of a ridge which extends to the International Boundary and is about one-half mile west of a hill with a prominent rock pile on it.

Station mark: A bronze disk set in a boulder.

**Sowers Northwest Base** (Montana, Phillips County; O. B. French, 1912; 1917).—About one-half mile southeast of International Boundary Monument 464; in NW $\frac{1}{4}$  sec. 5, T. 37 N., R. 30 E., principal meridian. The station is on the more southeastern of two prominent knolls.

Station mark: A bronze disk set in a boulder and a boulder marked with a cross 14 inches underground and directly under the surface mark.

**Sowers Southeast Base** (Montana, Phillips County; O. B. French, 1912).—About  $1\frac{1}{4}$  miles south of International Boundary Monument 464; near the center of sec. 8, T. 37 N., R. 30 E., principal meridian. The station is on the highest knoll in the vicinity.

Station mark: A bronze disk set in a boulder and a boulder marked with a cross about 1 foot underground and directly under the surface mark.

**Waters** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About  $4\frac{1}{4}$  miles north of International Boundary Monument 467; in NW $\frac{1}{4}$  sec. 30, T. 1, R. 13 W., third meridian, near the north-and-south midsection line. The station is on the highest point in the vicinity.

Station mark: A bronze disk set in a boulder.

**Dunbar** (Montana, Phillips County; J. J. McArthur, 1909; 1917).—Nearly 1 mile southwest of International Boundary Monument 473; in SE $\frac{1}{4}$  sec. 6, T. 37 N., R. 32 E., principal meridian. The station is on a prominent hill.

Station mark: Originally a bronze disk set in a boulder. In 1917 the bronze disk was found to have been removed from the boulder and the boulder pried out of the ground; the boulder was replaced in its original bed.

**Walsh** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About  $2\frac{1}{2}$  miles north of the International Boundary midway between Monuments 474 and 475; near the middle of sec. 14, T. 1, R. 12 W., third meridian. The station is on the highest point in the vicinity.

Station mark: A bronze disk set in a boulder.

**Kennedy** (Montana, Phillips County; J. J. McArthur, 1909; 1910).—About 5 miles south of International Boundary Monument 480. The station is on a flat-topped hill about 1 mile west of Frenchman Creek.

Station mark: A bronze disk set in rock.

**French** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909; 1910).—In NE $\frac{1}{4}$  sec. 1, T. 1, R. 11 W., third meridian; about 1 mile northeast of International Boundary Monument 480. The station is on the high hill north of that section of the road which crosses the boundary near Monument 480, and is about one-half mile from the road, on the western spur of the hill.

Station mark: A bronze disk set in rock.

**Moulstead** (Saskatchewan, Maple Creek District; C. H. Sinclair, 1910; 1917).—In S $\frac{1}{2}$  sec. 1, T. 1, R. 10 W., third meridian, near the north-and-south midsection line; about 400 meters north of International Boundary Monument 484. The station is on the table land, one-half mile east of the bluff east of Frenchman Creek.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Lewis** (Montana, Phillips County; C. H. Sinclair, 1910).—About 6 miles south of International Boundary Monument 484. The station is on the summit of the grassy flat-topped ridge about 2 miles east of Frenchman Creek.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**N.286-A** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—In SE $\frac{1}{4}$  sec. 4, T. 1, R. 9 W., third meridian; about 200 meters northwest of International Boundary Monument 486. The station is about 8 meters southwest of the steep slope to the coulee.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Grave** (Montana, Valley County; C. H. Sinclair, 1910).—About  $4\frac{1}{2}$  miles south of the International Boundary midway between Monuments 486 and 487; on a high flat hill just north of a slightly higher hill. The station is near the west brow of the hill.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Alkali** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—In NW¼ sec. 4, T. 1, R. 8 W., third meridian, near the west boundary of the section; about 1,100 meters northwest of International Boundary Monument 489. The station is on a prominent butte about 20 meters wide and 75 meters long, sloping gradually to the plain.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in a mound of concrete on a flat rock. A drill hole is in the rock, directly under the center of the disk.

**Rabbit** (Montana, Valley County; C. H. Sinclair, 1910).—About 2 miles south of International Boundary Monument 490. The station is on a flat-topped hill.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a crown of concrete on a granite boulder. A drill hole in the rock is directly under the center of the disk.

**S.282-A** (Montana, Valley County; C. H. Sinclair, 1910).—On the divide between McEacheran and Horse Creeks. The station is south of the International Boundary, about 249 meters from Monument 493, and is on the same ridge as the monument.

Station mark: A bronze disk set in a concrete pier.

**Sage** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—About 2¼ miles north of the International Boundary midway between Monuments 493 and 494; in SW¼ sec. 15, T. 1, R. 7 W., third meridian. The station is on a knoll with a slight bluff to the westward.

Station mark: A cross chiseled on a granite boulder.

**Creek** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—About 1 mile north of International Boundary Monument 495; in NE¼ sec. 1, T. 1, R. 7 W., third meridian. The station is about one-half mile east of Horse Creek, on a knob with a bluff on the north side.

Station mark: Probably a cross or drill hole in rock.

**Hay** (Montana, Valley County; C. H. Sinclair, 1910).—About 2 miles south of International Boundary Monument 496. The station is on a flat-topped rise of land about one-half mile east of Rock Creek.

Station mark: A drill hole and a triangle in a granite boulder.

**Rocky** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—About 2¼ miles north of International Boundary Monument 497; in SE¼ sec. 17, T. 1, R. 6 W., third meridian. The station is on a butte covered with granite boulders and outcroppings. A cairn is about 27 meters distant to the north.

Station mark: A drill hole and a triangle in a granite boulder.

**S.280** (Montana, Valley County; C. H. Sinclair, 1910).—About 1 mile east of Rock Creek. The station is on the same hill and 273 meters southeast of International Boundary Monument 497.

Station mark: A drill hole and a triangle in a granite boulder.

**Rocky Creek North Base** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—About 1¼ miles northwest of International Boundary Monument 496; in SW¼ sec. 7, T. 1, R. 6 W., third meridian. The station is on a rounded knoll about one-half mile east of Horse Creek.

Station mark: A bronze disk set in a concrete pier nearly flush with the ground.

**Rocky Creek South Base** (Montana, Valley County; C. H. Sinclair, 1910).—About three-fourths mile west of the point where Rocky Creek crosses the International Boundary, one-fourth mile north of the curve of the creek to the south. The station is on the top of a hill and is about 148 meters southwest of Monument 496.

Station mark: A bronze disk set in a concrete pier nearly flush with the ground.

**Iron** (Montana, Valley County; C. H. Sinclair, 1910).—About 1¼ miles southeast of International Boundary Monument 499, on the same ridge as the monument. The station is on the highest and more southern of two knobs. The knob is covered with red rock.

Station mark: A drill hole and a triangle in a red rock nearly flush with the ground.

**Smoky** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—About 1½ miles north of International Boundary Monument 501; in NW¼ sec. 8, T. 1, R. 5 W., third meridian. The station is on a rounded east-and-west ridge on the north side of Morgan Creek. It is near the east-and-west midsection line.

Station mark: A drill hole and a triangle in a granite boulder.

**Cone** (Montana, Valley County; C. H. Sinclair, 1910).—About 2¼ miles south of the International Boundary midway between Monuments 502 and 503. The station is on a conical hill, well defined and standing alone, about 1 mile south of the south branch of Morgan Creek.

Station mark: A drill hole and a triangle in a granite boulder nearly flush with the ground.

**Burnt** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—Nearly 1 mile north of International Boundary Monument 504; in NE¼ sec. 1, T. 1, R. 5 W., third meridian. The station is on a hill near the head of the south branch of Morgan Creek.

**Station mark:** A drill hole in a triangle in a granite boulder nearly flush with the ground—the only rock on the hill.

**Gravel** (Montana, Valley County; C. H. Sinclair, 1910).—About 2¾ miles south of International Boundary Monument 504. The station is on a small rounded hill between two branches of the south branch of Morgan Creek. The hill is covered with gravel.

**Station mark:** A drill hole and a triangle in a granite boulder nearly flush with the ground.

**N.276** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—In the southwest corner of SW¼ sec. 5, T. 1, R. 4 W., third meridian, 87.4 meters northwest of International Boundary Monument 505. The station is on the ridge forming the eastern limit of the watershed of the south branch of Morgan Creek.

**Station mark:** A drill hole in a granite boulder.

**Mound** (Montana, Valley County; C. H. Sinclair, 1910).—Nearly 2 miles south of the International Boundary midway between Monuments 506 and 507; about 5½ miles west of the West Branch of Poplar River, and on western edge of the plateau. The station is on a knoll resembling a mound.

**Station mark:** A drill hole and triangle in a granite boulder.

**Fox** (Montana, Valley County; C. H. Sinclair, 1910).—About 1 mile south of International Boundary Monument 507; on the northeast edge of the plateau about 3¾ miles west of the West Branch of Poplar River.

**Station mark:** A drill hole and triangle in a granite boulder nearly flush with the ground.

**Kid** (Montana, Valley County; C. H. Sinclair, 1910).—About 3 miles south of the International Boundary midway between Monuments 507 and 508; on the southeast edge of the plateau about 4 miles west of the West Branch of Poplar River.

**Station mark.** A drill hole and triangle in a red granite boulder.

**Badger** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—About 2 miles east of the West Branch of Poplar River; in SE¼ sec. 3, T. 1, R. 3 W., third meridian. The station is on a knoll about 600 meters north of International Boundary Monument 510.

**Station mark:** A drill hole and triangle in a granite boulder.

**Branch** (Montana, Valley County; C. H. Sinclair, 1910).—About 2 miles south of International Boundary Monument 511; on the east side of the West Branch of Poplar River, where the river makes a decided bend to the northeast and back to the southwest. The station is on a hill just north of a ranch.

**Station mark:** A drill hole and a triangle in a granite boulder nearly flush with the ground.

**Brace** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—About 1¼ miles northwest of International Boundary Monument 513; in NE¼ sec. 8, T. 1, R. 2 W., third meridian. The station is on the west edge of the plateau.

**Station mark:** A bronze disk set in a gray sandstone boulder nearly flush with the ground.

**Coal** (Montana, Valley County; C. H. Sinclair, 1910).—About 400 meters west of International Boundary Monument 514. The station is on the west edge of the plateau.

**Station mark:** A bronze disk marked "U. S. & C. B. SURVEY" set in a gray sandstone boulder nearly flush with the ground.

**Slim** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—About 3 miles north of International Boundary Monument 515; in SE¼ sec. 23, T. 1, R. 2 W., third meridian, about 100 meters from the south boundary and 300 meters from the east boundary of the section. The station is on the plateau between Coal and Lost Child Creeks.

**Station mark:** A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier nearly flush with the ground.

**Jeff** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—About 1¼ miles northeast of International Boundary Monument 515 and 1¼ miles in the same direction from Coal Creek. The station is on the plateau between Coal and Lost Child Creeks.

**Station mark:** A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier nearly flush with the ground.

**Windy** (Montana, Valley County; C. H. Sinclair, 1910).—About 1¼ miles south of International Boundary Monument 515; on the north edge of the bench forming the south side of Coal Creek valley.

**Station mark:** A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier nearly flush with the ground.

**Kick** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—About  $1\frac{1}{2}$  miles north of the International Boundary midway between Monuments 516 and 517; in the southeast corner of NE $\frac{1}{4}$  sec. 7, T. 1, R. 1 W., third meridian. The station is on the bench forming the north side of Coal Creek valley.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Noon** (Montana, Valley County; C. H. Sinclair, 1910).—Nearly  $1\frac{1}{4}$  miles southwest of International Boundary Monument 517; on the north edge of the tableland forming the south side of Coal Creek valley. The station is on a small knoll projecting into the valley.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Bostick** (Montana, Daniels County; C. H. Sinclair, 1910).—About  $2\frac{1}{4}$  miles southwest of International Boundary Monument 519; on the north edge of the tableland forming the south side of Coal Creek valley.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier nearly flush with the ground.

**N.268** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—In SW $\frac{1}{4}$  sec. 2, T. 1, R. 1 W. third meridian; on a rise on the flats between Coal and Lost Child Creeks. The station is about 600 meters north of International Boundary Monument 519.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier nearly flush with the ground.

**N.267** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910; 1912).—In SE $\frac{1}{4}$  sec. 5, T. 1, R. 30 W., second meridian; about 700 meters northeast of International Boundary Monument 521 and 350 meters from the boundary; near the east boundary of the section.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier nearly flush with the ground.

**Green** (Montana, Daniels County; C. H. Sinclair, 1910; 1912).—About 2 miles southwest of International Boundary Monument 522, on a small rounded hill on the north side of Coal Creek valley. The hill slopes gently to the west and northwest and steeply toward the east and north.

Station mark: A bronze disk set in a concrete pier.

**Black=Green North Base** (Montana, Daniels County; C. H. Sinclair, 1910; 1912).—On the north edge of the flat forming the southern limit of Lost Child Creek valley; about 500 meters south of International Boundary Monument 522.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier nearly flush with the ground.

**Green South Base** (Montana, Daniels County; O. B. French, 1912).—About  $1\frac{1}{4}$  miles southeast of International Boundary Monument 522. The station is on a very slight rise in the middle of a large plain, about 200 meters north of a low ridge.

Station mark: An iron pipe one-half inch in diameter and 1 foot below the surface of the ground. Immediately above it is a bronze disk. Above that is a piece of galvanized iron 10 by 15 inches in size with its edges about 6 inches below the surface of the ground but so folded that about 6 inches of its middle is exposed.

**Nick** (Montana, Daniels County; C. H. Sinclair, 1910).—About  $1\frac{1}{2}$  miles southwest of International Boundary Monument 524, near the south end of the bench between Coal and Lost Child Creeks. The station is on a slight rise of ground.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Sod** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—One-half mile northwest of International Boundary Monument 524; in SE $\frac{1}{4}$  sec. 1, T. 1, R. 30 W., second meridian. The station is on the ridge that juts northward into Lost Child Creek valley, and is about 150 meters south of the north extremity of the ridge.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Mud** (Montana, Daniels County; C. H. Sinclair, 1911).—About 100 meters south of the International Boundary, 500 meters east of Monument 525; on an east-and-west ridge. The station is about 8 meters south of the steep slope of the ridge.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Child** (Montana, Daniels County; C. H. Sinclair, 1911).—About 3 miles south of International Boundary Monument 527; on the highest part of a ridge one-half mile south of Coal Creek.

Station mark: A bronze disk set in concrete.



**Lost** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1910).—About 2½ miles north of International Boundary Monument 527; 72 meters northwest of the quarter-section corner on the east line of sec. 14, T. 1, R. 29 W., second meridian.

Station mark: A bronze disk set in a concrete pier.

**Harris** (Montana, Daniels County; C. H. Sinclair, 1911).—About three-fourths mile southeast of International Boundary Monument 527; one-half mile south of the upper crossing of the International Boundary by Lost Child Creek. The station is on the north edge of the ridge.

Station mark: A cairn over a bronze disk set in a concrete pier.

**Middle** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911).—About 1 mile north of the International Boundary midway between Monuments 530 and 531 at a point where the boundary is crossed by a well defined valley; near the north boundary of NE¼ sec. 3, T. 1, R. 28 W., second meridian. The station is about 140 meters southeast of the top of the ridge.

Station mark: A bronze disk set in a concrete pier.

**Fork** (Montana, Daniels County; C. H. Sinclair, 1911).—About three-fourths mile southwest of International Boundary Monument 531; on the east side of the valley that crosses the International Boundary midway between Monuments 530 and 531. The station is on the most northern of three low hills.

Station mark: A bronze disk set in a concrete pier.

**Scobey** (Montana, Daniels County; C. H. Sinclair, 1911).—About one-half mile southeast of International Boundary Monument 532. The station is on the highest part of the ridge.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Break** (Montana, Daniels County; C. H. Sinclair, 1911).—About one-half mile south of International Boundary Monument 533. The station is on a flat-topped hill and is about 50 meters south of the head of a deep draw that slopes to the southwest.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Knoll** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911).—About 1½ miles north of International Boundary Monument 534; near the west boundary of sec. 9, T. 1, R. 27 W., second meridian, and near the east-and-west midsection line. The station is on the more southern of two detached knolls.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier. One reference mark is a hammer mark on a stone 19.26 meters from the station in azimuth 135°. A second reference mark is a hammer mark on a stone 9.5 meters from the station in azimuth 180°. A third reference mark is a hammer mark on a stone 7.38 meters from the station in azimuth 270°.

**Pole** (Montana, Daniels County; C. H. Sinclair, 1911).—About 1¼ miles southwest of International Boundary Monument 535, on the west side of a valley which extends northwestward across the boundary. The station is on a small gravel ridge.

Station mark: A mound of stones 5 feet in diameter over a bronze disk marked "U. S. & C. B. SURVEY" buried 5 inches in the ground.

**Din** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911).—About 1 mile north of International Boundary Monument 535; in the northwest corner of NW¼ sec. 2, T. 1, R. 27 W., second meridian. The station is on a large mound. East about 200 meters from the station is a hump on which are an Indian grave and a 3-foot cairn.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier. One reference mark is an arrow on a granite boulder 12.58 meters from the station in azimuth 215°. A second reference mark is a crossed arrow on a sandstone boulder 4.47 meters from the station in azimuth 5°. A third reference mark is a cross on a crumbling quartz boulder 10.33 meters from the station in azimuth 70°.

**Coy** (Montana, Daniels County; C. H. Sinclair, 1911).—On a ridge, south about 300 meters from, and approximately at the same elevation as, International Boundary Monument 535.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier. One reference mark is a cairn 4.35 meters from the station in azimuth 280°. A second reference mark is a cross in a gray rock 8.51 meters from the station in azimuth 265°. A third reference mark is a crossed arrow on a partly buried red disk-shaped rock 7.85 meters from the station in azimuth 105°. A fourth reference mark is an arrow on a black rock 7.79 meters from the station in azimuth 45°.

**Nice** (Montana, Daniels County; C. H. Sinclair, 1911).—About 1¼ miles south of International Boundary Monument 536, on a small knoll on the ridge that leads down from the monument. It is about 3 miles west of the East Fork of Poplar River.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier. One reference mark is a cross on a yellow stone 19.55 meters from the station in azimuth 110°. A second reference mark is an arrow on a crumbling granite boulder 5.64 meters from the station in azimuth 180°. A third reference mark is a crossed arrow on a stone 2.77 meters from the station in azimuth 345°.

**Fee** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911).—About  $1\frac{1}{2}$  miles north of International Boundary Monument 538; in  $S\frac{1}{2}$  sec. 9, T. 1, R. 26 W., second meridian, near the north-and-south midsection line. The station is about 80 meters east of the East Fork of Poplar River about 250 meters northeast of some homestead buildings. It is on a gravel hump approximately 20 feet above the general elevation.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Har** (Montana, Daniels County; C. H. Sinclair, 1911).—About  $1\frac{1}{4}$  miles southwest of International Boundary Monument 359, and about one-half mile east of the East Fork of Poplar River. The station is on a flat-topped hill.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Ray=Ogden Northwest Base** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911; 1912).—About one-fourth mile northwest of International Boundary Monument 540; in  $SE\frac{1}{4}$  sec. 2, T. 1, R. 26 W., second meridian. The station is on the highest knoll in the vicinity.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier. The reference mark is a crossed arrow on a granite boulder 4.45 meters from the station in azimuth  $245^\circ$ .

**Fil** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911).—About  $1\frac{1}{4}$  miles north of International Boundary Monument 540; in  $SW\frac{1}{4}$  sec. 12, T. 1, R. 26 W., second meridian. The station is on the middle one of several small mounds which form a ridge extending north-northeastward.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier. One reference mark is a crossed arrow on a granite boulder 9.395 meters from the station in azimuth  $20^\circ$ . A second reference mark is an arrow on a granite boulder 5.87 meters from the station in azimuth  $155^\circ$ . A third reference mark is a cross on a granite boulder 9.37 meters from the station in azimuth  $340^\circ$ .

**Ogden=Ogden Southeast Base** (Montana, Daniels County; C. H. Sinclair, 1911).—About three-fourths mile southeast of International Boundary Monument 540, on the same ridge as the monument. The station is on a flat-topped knoll at the end of the ridge.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier. One reference mark is a crossed arrow on a bluish granite boulder 3.16 meters from the station in azimuth  $60^\circ$ . A second reference mark is an arrow on a white rock 8.7 meters from the station in azimuth  $80^\circ$ . A third reference mark is a cross on a quartz and granite boulder 14.18 meters from the station in azimuth  $198^\circ$ .

**Neil** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911).—About  $1\frac{1}{2}$  miles northeast of International Boundary Monument 543; in  $SE\frac{1}{4}$  sec. 10, T. 1, R. 25 W., second meridian, near the east boundary of the section. The station is on a flat-topped hill.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Merril** (Montana, Daniels County; C. H. Sinclair, 1911).—About  $1\frac{1}{4}$  miles southwest of International Boundary Monument 544. The station is on a flat-topped hill about one-half mile south of a rocky bluff 1 mile southwest of the monument.

Station mark: A small cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Hearst** (Montana, Daniels County; C. H. Sinclair, 1911).—About 1 mile southeast of International Boundary Monument 546, on the ridge tending in a southerly direction that crosses the boundary a little east of the monument. The station is on a low round-topped hill, about one-fourth mile southeast of a slightly higher rocky hill.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Spring** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911).—About  $1\frac{1}{4}$  miles north of the International Boundary midway between Monuments 546 and 547; in  $SW\frac{1}{4}$  sec. 9, T. 1, R. 24 W., second meridian, near the west boundary of the township, on the high ridge north of the west fork of Beaver Creek. The station is on the highest knob of the ridge and is about 1 mile north of the creek.

Station mark: A small cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Pull** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911).—About one-third mile north of International Boundary Monument 548; in  $SW\frac{1}{4}$  sec. 2, T. 1, R. 24 W., second meridian. The station is on the most southern of the nearby hills.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Pebble** (Montana, Daniels County; C. H. Sinclair, 1911).—A little over 1 mile south of the International Boundary midway between Monuments 548 and 549. The station is on the south end of the ridge tending southwestward from the boundary.

Station mark: A small cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Beaver** (Montana, Sheridan County; C. H. Sinclair, 1911).—About  $1\frac{1}{2}$  miles south of International Boundary Monument 550; in NE $\frac{1}{4}$  sec. 7, T. 37 N., R. 51 E., principal meridian. The station is on a rocky ridge, about one-third mile west of Beaver Creek, at a point where the creek turns eastward, then northward, and then eastward again.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a mass of concrete. One reference mark is a cross on a rock 15.09 meters from the station in azimuth  $20^{\circ}$ . A second reference mark is an arrow on a flat-topped square rock 3.77 meters from the station in azimuth  $150^{\circ}$ . A third reference mark is a crossed arrow on a rock 6.11 meters from the station in azimuth  $275^{\circ}$ .

**Robinson** (Montana, Sheridan County; C. H. Sinclair, 1911).—About  $1\frac{1}{4}$  miles south of the International Boundary midway between Monuments 553 and 554; in NE $\frac{1}{4}$  sec. 12, T. 37 N., R. 51 E., principal meridian, near the north boundary of the section. The station is on a prominent knoll.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Pasture** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911).—About  $2\frac{1}{2}$  miles northwest of International Boundary Monument 554; in SE $\frac{1}{4}$  sec. 18, T. 1, R. 22 W., second meridian. The station is on the more southern of two peaks on a prominent ridge.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Giles** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911).—About 2 miles north of International Boundary Monument 556; in the southwest corner of NE $\frac{1}{4}$  sec. 14, T. 1, R. 22 W., second meridian. The station is on the top of the highest knoll of the ridge east of Big Muddy River and north of Carlisle Coulee.

Station mark: A small cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Zemper** (Montana, Sheridan County; C. H. Sinclair, 1911).—About three-fourths mile east of International Boundary Monument 557 and approximately 200 meters south of the boundary; in NW $\frac{1}{4}$  sec. 6, T. 37 N., R. 53 E., principal meridian. The station is on the first ridge east of the monument and is about 5 meters south of a large rock pile on the edge of a cultivated field.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a mass of concrete.

**Look** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About one-half mile north of the International Boundary midway between Monuments 557 and 558; in SW $\frac{1}{4}$  sec. 5, T. 1, R. 21 W., second meridian. The station is on the ridge on the east side and near the source of a deep brushy valley running northwest to Carlisle Coulee.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a mass of concrete.

**Carlisle** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About  $2\frac{1}{4}$  miles north of International Boundary Monument 558; in N $\frac{1}{2}$  sec. 17, T. 1, R. 21 W., second meridian, near the north-and-south midsection line. The station is on a flat ridge about three-fourths mile north of the wagon road from Big Muddy Creek. A coulee leads up to the ridge near where the road turns sharply to the northeast.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Johnson** (Montana, Sheridan County; C. H. Sinclair, 1911).—About 300 meters southeast of International Boundary Monument 558; in NE $\frac{1}{4}$  sec. 5, T. 37 N., R. 53 E., principal meridian. The station is on the flat bench crossing the boundary. A deep gully lies just west of the station.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Out** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About one-fourth mile east of International Boundary Monument 560, and 100 meters north of the boundary; in SE $\frac{1}{4}$  sec. 3, T. 1, R. 21 W., second meridian. The station is on a low knob which is the only point in the vicinity where a station could be established to see through the valley to the northwest.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY".

**Lump** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About  $1\frac{1}{4}$  miles north of International Boundary Monument 560; in NW $\frac{1}{4}$  sec. 11, T. 1, R. 21 W., second meridian. The station is on a well defined knob, the only point in the vicinity from which the high ridge along the boundary and the flat country to the east can be seen.

Station mark: A bronze disk set in concrete.

**Guard** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—In SW $\frac{1}{4}$  sec. 6, T. 1, R. 20 W., second meridian. The station is about 70 meters north of the International Boundary, on a small hill about midway between Monuments 561 and 562.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Rose** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About  $2\frac{1}{2}$  miles northwest of International Boundary Monument 562; in SE $\frac{1}{4}$  sec. 18, T. 1, R. 20 W., second meridian. The station is on the southeast point of a low ridge.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Rood** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About  $2\frac{1}{2}$  miles north of International Boundary Monument 563; in  $W\frac{1}{2}$  sec. 16, T. 1, R. 20 W., second meridian, near the east-and-west midsection line. The station is on a high ridge over which a road crosses about one-fourth mile to the north.

Station mark: A small cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**In** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About one-third mile northwest of International Boundary Monument 563; in  $SE\frac{1}{4}$  sec. 5, T. 1, R. 20 W., second meridian. The station is on a low ridge, slightly higher than the surrounding hills.

Station mark: A small cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Fly** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About one-fourth mile northeast of International Boundary Monument 564; in  $SE\frac{1}{4}$  sec. 3, T. 1, R. 20 W., second meridian. The station is on a low but very prominent hill.

Station mark: A small cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Berry** (Montana, Sheridan County; C. H. Sinclair, 1911).—About one-half mile southwest of International Boundary Monument 565; in  $NW\frac{1}{4}$  sec. 2, T. 37 N., R. 54 E., principal meridian. The station is on a low bench just above a meadow.

Station mark: A small cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Wild** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About  $1\frac{1}{4}$  miles northeast of International Boundary Monument 565; in  $NW\frac{1}{4}$  sec. 12, T. 1, R. 20 W., second meridian; on a ridge on the southwest side of a very deep, long coulee. The station is on the east and highest point of the ridge.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**View** (Montana, Sheridan County; C. H. Sinclair, 1911).—About  $1\frac{1}{4}$  miles south of International Boundary Monument 567; in  $NW\frac{1}{4}$  sec. 8, T. 37 N., R. 55 E., principal meridian. The station is on the higher of two knolls forming a ridge lying north and south.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Man** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About  $1\frac{1}{4}$  miles northwest of International Boundary Monument 568; in  $NE\frac{1}{4}$  sec. 9, T. 1, R. 19 W., second meridian. The station is on the top of a very prominent hill, known locally as Wild Man's Butte. It is near the east end of a large alkali lake.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**White** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About three-fourths mile north of International Boundary Monument 570; in  $NW\frac{1}{4}$  sec. 1, T. 1, R. 19 W., second meridian. The station is on the first bench above the alkali lake just east of Wild Man's Butte.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Chap** (Montana, Sheridan County; C. H. Sinclair, 1911).—About  $1\frac{1}{4}$  miles south of International Boundary Monument 570; in  $SE\frac{1}{4}$  sec. 11, T. 37 N., R. 55 E., principal meridian. The station is on a prominent round-topped hill.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Thompson** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About one-half mile northwest of International Boundary Monument 573; in  $SW\frac{1}{4}$  sec. 3, T. 1, R. 18 W., second meridian. The station is on a high tableland.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Blondie** (Montana, Sheridan County; C. H. Sinclair, 1911).—About  $2\frac{1}{4}$  miles south of International Boundary Monument 573; in  $SW\frac{1}{4}$  sec. 10, T. 37 N., R. 56 E., principal meridian. The station is on an isolated knob.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Round** (Montana, Sheridan County; C. H. Sinclair, 1911).—About 1 mile southwest of International Boundary Monument 576; in  $SE\frac{1}{4}$  sec. 6, T. 37 N., R. 57 E., principal meridian. The station is on a prominent low hill on the ridge tending southerly from the boundary.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Knute** (Montana, Sheridan County; C. H. Sinclair, 1911).—About 3 miles south of International Boundary Monument 579; in  $SW\frac{1}{4}$  sec. 14, T. 37 N., R. 57 E., principal meridian. The station is on the highest hill in the vicinity.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete. The witness mark is a crossed arrow on a large white granite boulder 3.75 meters from the station, in azimuth  $225^\circ$ .

**Knute South Base** (Montana, Sheridan County; O. B. French, 1912).—About 3 miles southwest of International Boundary Monument 580; in SW¼ sec. 13, T. 37 N., R. 57 E., principal meridian. The station is on a high, round hill, about 200 meters south of the corner of a fence. There is a similar hill about one-fourth mile south. The country to the west has hills about as high as the station and the country to the east is lower.

Station mark: A cross on a boulder in place, about 2 inches above the surface of the ground.

**Knute North Base** (Montana, Sheridan County; O. B. French, 1912).—About 2 miles southwest of International Boundary Monument 580; in SW¼ sec. 12, T. 37 N., R. 57 E., principal meridian. The station is on one of the many small hills in the vicinity. There is a higher hill in a northeasterly direction.

Station mark: A drill hole and a triangle on a large flat boulder flush with the surface of the ground. The subsurface mark is a cross on a boulder 1½ feet underground. The reference mark is a small white limestone boulder placed edgewise, 1.18 meters from the station in azimuth 285°.

**Finley** (Montana, Sheridan County; C. H. Sinclair, 1911).—About 2¼ miles south of the International Boundary midway between Monuments 581 and 582, near the corner of secs. 8, 9, 16, and 17, T. 37 N., R. 58 E., principal meridian. The station is on a very prominent hill on a high, rolling ridge.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Deal** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About two-thirds mile north of International Boundary Monument 582; in NW¼ sec. 3, T. 1, R. 16 W., second meridian. The station is on a flat-topped hill.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Fine** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 2¼ miles south of International Boundary Monument 586; near the west boundary and the east-and-west midsection line of sec. 8, T. 163 N., R. 102 W., fifth principal meridian. The station is 2½ miles southwest of Skermo post office, on a high flat-topped, detached hill.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Foster** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About one-half mile north of the International Boundary midway between Monuments 586 and 587; in SE¼ sec. 4, T. 1, R. 15 W., second meridian. The station is on a high, flat ridge overlooking a valley to the northwest. It is adjacent to, and on the south side of, a cultivated field.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Flew** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—In the southwest corner of SW¼ sec. 5, T. 1, R. 14 W., second meridian. The station is 154 meters northwest of International Boundary Monument 589 and about 100 meters north of the boundary, on a high, narrow ridge.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Skermo** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 3 miles southeast of International Boundary Monument 590; in SE¼ sec. 9, T. 163 N., R. 101 W., fifth principal meridian. The station is on the highest hill on the high ridge east of Skermo post office.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Fled** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—In SE¼ sec. 2, T. 1, R. 14 W., second meridian; about 300 meters northeast of International Boundary Monument 591. The station is on a knoll, slightly higher than the monument.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Olsen** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About one-third mile north of the International Boundary midway between Monuments 593 and 594; in SE¼ sec. 5, T. 1, R. 13 W., second meridian. The station is on a prominent knoll.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Brown** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 2¼ miles southwest of International Boundary Monument 394; near the center of sec. 8, T. 163 N., R. 100 W., fifth principal meridian. The station is on a low knoll about 250 meters from a house.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Ruin** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 1½ miles southeast of International Boundary Monument 595; in NE¼ sec. 3, T. 163 N., R. 100 W., fifth principal meridian. The station is on a flat about 50 meters east of a small valley which lies north and south.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Gopher** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About 10 meters north of the International Boundary approximately midway between Monuments 595 and 596; in SE¼ sec. 2, T. 1, R. 13 W., second meridian. The station is near the south end of a small hill.

Station mark: A small cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Hagen** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About two-thirds mile north of International Boundary Monument 598; in NE¼ sec. 5, T. 1, R. 12 W., second meridian; near the road on the east boundary of the section and about 200 meters north of the east-and-west midsection line.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Ledge** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 1¼ miles south of International Boundary Monument 598; near the south boundary of sec. 32, T. 164 N., R. 99 W., fifth principal meridian, close to the north-and-south midsection line. The station is northwest of, and close to a large rock.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete close to the ground.

**Ambrose** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 1½ miles southeast of International Boundary Monument 600; in NW¼ sec. 2, T. 163 N., R. 99 W., fifth principal meridian. The station is on a small rise in an open, grassy prairie.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**School** (North Dakota, Divide County; C. H. Sinclair, 1911).—See description of "Ambrose Northeast Base."

**Jasper** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 7½ miles south of International Boundary Monument 595; in NW¼ sec. 3, T. 162 N., R. 100 W., fifth principal meridian. The station is about 2½ miles nearly due south of Colgan post office, on a rounded knoll of the range of hills lying east and west.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in concrete. A few large boulders are about 2 meters to the northwestward.

**Bilby** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 6 miles south of International Boundary Monument 599; in SW¼ sec. 28, T. 163 N., R. 99 W., fifth principal meridian. The station is on a hill about one-half mile southeast of a gray house with a sun parlor on the east side. It is about 2 miles south of the road from Ambrose to Colgan.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a block of concrete.

**Nat** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 1 mile south of a point on the International Boundary one-half mile west of Monument 602; in SW¼ sec. 31, T. 164 N., R. 98 W., fifth principal meridian; about 1 mile east of Ambrose post office. The station is east of the center of the road on the west boundary of the section, on a hill. It is approximately 2 meters west of the fence on the east side of the road.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Ambrose West Base** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 3 miles south of International Boundary Monument 601; in SE¼ sec. 11, T. 163 N., R. 99 W., fifth principal meridian. The station is on the Minnesota, St. Paul and Sault Ste. Marie Railway, about 550 meters west of Ambrose railway station and 10.634 meters north of the center of the south rail.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Ambrose East Base** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 3 miles southwest of International Boundary Monument 602; in SW¼ sec. 7, T. 163 N., R. 98 W., fifth principal meridian, about 100 meters from the west boundary of the section. The station is on the Minnesota, St. Paul and Sault Ste. Marie Railway, about 1¼ miles east of station "Ambrose West Base" and 78 meters east of the 590-mile post. It is 10.634 meters north of the center of the south rail.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Friess** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About 1 mile north of International Boundary Monument 602; in SW¼ sec. 8, T. 1, R. 11 W., second meridian. The station is about 100 meters from the south boundary of the section and on the road allowance at the west boundary. It is on a small hill.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Wheat** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About three-fourths mile north of International Boundary Monument 603; in NW¼ sec. 4, T. 1, R. 11 W., second meridian; near a ranch house.

Station mark: Not recorded, but probably a bronze disk marked "U. S. & C. B. SURVEY" set in rock or concrete.

**Gubert** (North Dakota, Divide County; C. H. Sinclair, 1911).—About three-fourths mile south of International Boundary Monument 603; near the center of sec. 33, T. 164 N., R. 98 W., fifth principal meridian. The station is on a slight rise in the road reservation.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Lister** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About 1 mile northeast of International Boundary Monument 605; in NW¼ sec. 6, T. 1, R. 10 W., second meridian. The station is about 150 meters from the north boundary of the section, in a farmyard, about 20 meters southeast of a house.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in concrete nearly flush with the ground.

**Huso** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 1½ miles south of the International Boundary midway between Monuments 605 and 606; in NW¼ sec. 6, T. 163 N., R. 97 W., fifth principal meridian. The station is on the east side of the road at the west boundary of the section and is approximately 300 meters from the north boundary. The slope of the road changes at the station.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Hold** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About 1 mile north of International Boundary Monument 607; in NE¼ sec. 4, T. 1, R. 10 W., second meridian. The station is on a rise about 250 meters west of a road and 100 meters from the north boundary of the section.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in concrete buried 20 inches in the ground, with small stones filling the hole.

**Bloom** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 1 mile southeast of International Boundary Monument 607; in SE¼ sec. 33, T. 164 N., R. 97 W., fifth principal meridian. The station is on a small rise about one-third mile west of the road at the east boundary of the section.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in concrete.

**Church** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 1 mile south of the International Boundary midway between Monuments 608 and 609; in SW¼ sec. 35, T. 164 N., R. 97 W., fifth principal meridian. The station is about 260 meters from the road at the south boundary of the section. It is on a slight rise in a field, about 240 meters north and slightly west of some buildings.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in concrete buried 20 inches in the ground, with small rocks placed over it before filling the hole with earth.

**Good** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About one-half mile northwest of International Boundary Monument 610; in SE¼ sec. 1, T. 1, R. 10 W., second meridian. The station is on a small hill.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete block buried 20 inches in the ground, with a few rocks placed in the hole before filling with earth.

**Mouse** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 1¼ miles south of International Boundary Monument 610; in SE¼ sec. 31, T. 164 N., R. 96 W., fifth principal meridian. It is about 50 meters from the road at the south boundary of the section and approximately 250 meters from the west boundary. The station is on a slight rise.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete block buried 20 inches in the ground, with rocks placed in the hole before filling with earth.

**Bacon** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 1 mile south of International Boundary Monument 612; in SE¼ sec. 34, T. 164 N., R. 96 W., fifth principal meridian, about 3 meters from the north-and-south, and 200 meters from the east-and-west midsection lines. The station is on the west side of a flat-topped mound.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete block buried 20 inches in the ground, with a few rocks placed in the hole before filling with earth.

**Hansen** (Saskatchewan, Assiniboia District; C. H. Sinclair, 1911).—About one-half mile north of the International Boundary, midway between Monuments 612 and 613; in NW¼ sec. 2, T. 1, R. 9 W., second meridian. The station is on a flat-topped knoll about 100 meters north of the east-and-west road and 400 meters west of the house near the center of the section.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete block buried about 20 inches in the ground, with a few rocks placed in the hole before filling with earth.

**Feeney** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 1 mile south of the crossing of the International Boundary by Long Creek, about midway between Monuments 613 and 614; in SW¼ sec. 31, T. 164 N., R. 95 W., fifth principal meridian. The station is on the east bank of Long Creek where the creek flows from the west and turns sharply back to the northwest. It is about 70 meters southeast of the turn on the west side of the road.

Station mark: A cairn over a bronze disk marked "U. S. & C. B. SURVEY" set in a concrete pier.

**Burner** (Saskatchewan, Assiniboia District; C. H. Sinclair, 1911).—About three-fourths mile northwest of International Boundary Monument 614; in NE¼ sec. 8, T. 1, R. 8 W., second meridian, approximately 75 meters from the east boundary of the section and 300 meters from the east-and-west midsection line. The station is on a slight elevation about 300 meters east of Long Creek.

Station mark: A flat rock over a bottle buried 2 feet in the ground.

**Just** (Saskatchewan, Assiniboia District; C. H. Sinclair, 1911).—About 300 meters north of the road along the International Boundary, one-fourth mile east of Monument 615; in SW¼ sec. 3, T. 1, R. 8 W., second meridian, approximately 200 meters from the west boundary of the section. The station is on a slight elevation.

Station mark: A bottle buried 2 feet in the ground.

**Plow** (North Dakota, Divide County; C. H. Sinclair, 1911).—About 1½ miles southwest of International Boundary Monument 616; in NE¼ sec. 3, T. 163 N., R. 95 W., fifth principal meridian. The station is in the highest part of a field, approximately one-fourth mile from the road on the north boundary of the section, and one-half mile from the road on the west boundary.

Station mark: A flat rock over a bottle buried 2 feet in the ground.

**Ross** (Saskatchewan, Assiniboia District; C. H. Sinclair, 1911; 1912).—About 100 meters north of the International Boundary midway between Monuments 617 and 618; in SE¼ sec. 6, T. 1, R. 7 W., second meridian. The station is on the south edge of a flat ridge.

Station mark: A flat rock over a bottle neck buried 2 feet underground.

**Corn** (North Dakota, Burke County; C. H. Sinclair, 1911; 1912).—About 2 miles southwest of International Boundary Monument 618; in SE¼ sec. 6, T. 163 N., R. 94 W., fifth principal meridian. On the highest knoll in the vicinity. The station is on the southwest part of the top of the knoll.

Station mark: A flat rock over a bottle buried 2 feet underground.

**Ross West Base** (North Dakota, Divide County; O. B. French, 1912).—About 1¼ miles south of International Boundary Monument 617; in NE¼ sec. 1, T. 163 N., R. 95 W., fifth principal meridian. The station is on the south side of the road at the north boundary of the township and about 330 meters from the road on the east boundary. It is about 6 meters from the plowed field at the west end of the high part of the land.

Station mark: A cross on a boulder set flush with the ground, with another boulder also marked by a cross set 2 feet under the upper one.

**Ross East Base** (North Dakota, Burke County; O. B. French, 1912).—About 1¼ miles southwest of International Boundary Monument 618; in NE¼ sec. 6, T. 163 N., R. 94 W., fifth principal meridian. The station is on the south side of the road on the north boundary of the section and is about 100 meters from the road on the east boundary.

Station mark: A cross on a boulder set flush with the ground, with another boulder also marked by a cross set 16 inches below the upper one.

**Crosby 2** (North Dakota, Burke County; J. J. McArthur, 1910; 1911). About 2¼ miles southwest of International Boundary Monument 620; in SW¼ sec. 3, T. 163 N., R. 94 W., fifth principal meridian. The station is about 22 meters north of the center of the road on the south boundary of the section, on the north edge of a large stone pile.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a rock 2 feet underground.

**Percee** (Saskatchewan, Assiniboia District; J. J. McArthur, 1910).—About 1¼ miles northeast of International Boundary Monument 624; in SW¼ sec. 10, T. 1, R. 6 W., second meridian. The station is 200 meters north of the road on the south boundary of the section and 160 meters from the north-and-south midsection line.

Station mark: A bronze disk set in a boulder.

**Columbus** (North Dakota, Burke County; J. J. McArthur, 1910).—About 1¼ miles south of the International Boundary midway between Monuments 624 and 625; in SW¼ sec. 3, T. 163 N., R. 93 W., fifth principal meridian, approximately 43 meters south of the east-and-west, and 200 meters from the north-and-south midsection lines.

Station mark: A bronze disk set in a boulder.

**Center II** (North Dakota, Burke County; J. J. McArthur, 1910; 1918).—In fractional sec. 26, T. 164 N., R. 93 W., fifth principal meridian; about 100 meters south of International Boundary Monument 625. The station is about 10 meters south of a building.

Station mark: A bronze disk set in a rock.



**Rival** (North Dakota, Burke County; J. J. McArthur, 1910).—About  $1\frac{1}{4}$  miles south of the International Boundary midway between Monuments 627 and 628; in NW $\frac{1}{4}$  sec. 5, T. 163 N., R. 92 W., fifth principal meridian. The station is on the north side of the east-and-west midsection road and about 640 meters from the west boundary of the section.

Station mark: A bronze disk set in a boulder.

**South Portal** (North Dakota, Burke County; J. J. McArthur, 1910).—About  $2\frac{1}{4}$  miles southeast of International Boundary Monument 632; in SW $\frac{1}{4}$  sec. 3, T. 163 N., R. 91 W., fifth principal meridian, about 200 meters north and 342 meters east of the southwest corner of the section. The station is on a prominent knoll.

Station mark: A drill hole in a boulder.

**Portal North Base** (North Dakota, Burke County; O. B. French, 1912; 1919).—About 1 mile southeast of International Boundary Monument 630 at Portal, North Dakota; in SE $\frac{1}{4}$  sec. 31, T. 164 N., R. 91 W., fifth principal meridian. The station is on the east side of the Soo Line Railway track, 15 meters from the west rail, on a slight rise of the ground, but below the level of the railroad track. It is one-half mile from the intersection of the railway track with the road on the east boundary of the section.

Station mark: A cross on a stone about 10 inches in diameter and 6 inches thick set just below the surface of the ground. Another stone weighing about 150 pounds with a cross on it is set directly under the upper one, with its top 18 inches below the surface of the ground.

**Portal South Base** (North Dakota, Burke County; O. B. French, 1912; 1919).—About 3 miles southeast of International Boundary Monument 630; in SW $\frac{1}{4}$  sec. 4, T. 163 N., R. 91 W., fifth principal meridian. The station is on the east side of the Soo Line Railway track, 15.385 meters from the west rail, on the first bench north of the prominent ridge which is just north of the crossing of the railroad by the road,  $2\frac{1}{4}$  miles south of the boundary. It is about 200 meters north of the road and near the east boundary of the section.

Station mark: A cross on a hard, blue stone weighing about 100 pounds set just below the surface of the ground. Another stone, about 1 foot in diameter with a cross on it, is set directly under the upper one, with its top 21 inches below the surface of the ground.

**Spy** (Saskatchewan, Assiniboia District; J. J. McArthur, 1910).—About  $1\frac{1}{4}$  miles northwest of International Boundary Monument 638; in SW $\frac{1}{4}$  sec. 12, T. 1, R. 3 W., second meridian. It is about two-thirds mile west of the Canadian National Railway track at a point 1 mile north of Northgate, Saskatchewan. The station is on the highest part of the hill.

Station mark: A bronze disk set in a boulder.

**Morse** (North Dakota, Renville County; J. J. McArthur, 1910; 1918).—About  $2\frac{1}{4}$  miles south of International Boundary Monument 653. The station is on a rise in the field 145 meters east of the road on the west boundary of sec. 4, T. 163 N., R. 86 W., fifth principal meridian, and is about 200 meters north of the south boundary of the section.

Station mark: A cross on a boulder set flush with the ground. Another boulder with a cross on it is buried 2 feet below the surface of the ground, directly under the upper one.

**Center VIII** (Saskatchewan, Assiniboia District; J. J. McArthur, 1910; 1919).—About 165 meters northwest of International Boundary Monument 655; in the southwest corner of SW $\frac{1}{4}$  sec. 1, T. 1, R. 33 W., principal meridian. The station is on the highest ground in the vicinity.

Station mark: Originally a wooden hub driven flush with the ground. The station was re-marked in 1919. The subsurface mark is now a cross cut with a chisel on a granite boulder 10 by 10 by 6 inches placed with its top surface 18 inches below the surface of the ground. The surface mark is a bronze disk set in the top of a stone 8 by 10 by 20 inches set on end on top of the lower stone.

**Morse West Base** (North Dakota, Renville County; O. B. French, 1912; 1918).—About  $2\frac{1}{4}$  miles south of the International Boundary midway between Monuments 653 and 654. The station is on the south side of the road at the south boundary of sec. 3, T. 163 N., R. 86 W., fifth principal meridian. It is about  $18\frac{1}{2}$  meters south of the fence on the north side of the road, and 125 meters from the fence on the east side of the road at the west boundary of the section.

Station mark: A cross on a boulder projecting slightly above the surface of the ground. Another boulder with a cross on it is buried 18 inches below the surface of the ground, directly under the upper one.

**Morse East Base** (North Dakota, Renville County; O. B. French, 1912; 1918).—About  $2\frac{1}{4}$  miles south of International Boundary Monument 655. The station is on the south side of the road at the south boundary of sec. 2, T. 163 N., R. 86 W., fifth principal meridian. It is about 6 meters south of the center of the road on the most prominent little elevation in the vicinity.

Station mark: A cross on a boulder set flush with the ground. Another boulder with a cross on it is buried 2 feet below the surface of the ground, directly under the upper one.

**Center X** (North Dakota, Bottineau County; J. J. McArthur, 1910).—About 300 meters south of the International Boundary at a point one-half mile west of Monument 674; in the west half of fractional sec. 25, T. 164 N., R. 82 W., fifth principal meridian. The station is on a knoll.

Station mark: A wooden hub driven flush with the ground. The subsurface mark is an iron bolt, 1 foot below the surface, directly under the hub.

**Center XI** (Manitoba, Souris District; J. J. McArthur, 1910; 1919).—About 9 meters north of the International Boundary at a point 380 meters west of Monument 676; in SW¼ sec. 4, T. 1, R. 28 W., principal meridian.

Station mark: The original mark was a wooden hub driven flush with the ground. In 1919 the station was recovered and re-marked. The subsurface mark is now a cross cut on a limestone boulder 14 by 18 by 6 inches set with its face 18 inches below the surface of the ground. The surface mark is a bronze disk set in the top of a marble boulder 12 by 14 by 20 inches set on end with its top just above the surface of the ground.

**Knoll** (Manitoba, Souris District; J. J. McArthur, 1910; 1919).—About 1¼ miles north of International Boundary Monument 692; on a prominent high conical hill in NE¼ sec. 8, T. 1, R. 24 W., principal meridian; about 150 meters northwest of a house.

Station mark: The original mark was a wooden hub driven flush with the ground. In 1919 the station was re-marked. The surface mark is now a bronze disk set in a granite boulder 14 by 18 by 20 inches set with its top about flush with the ground. The subsurface mark is a cross cut in a limestone boulder about 20 by 20 by 12 inches, the top of which is about 20 inches below the surface of the ground. One reference mark is a cross cut in a granite boulder nearly 3 feet in diameter, 14.3 meters northeast of the station. A second reference mark is a cross cut in a large granite boulder about 4 feet in diameter 22.7 meters nearly west of the station.

**Bottineau** (Manitoba, Souris District; J. J. McArthur, 1910; 1919).—On the first high ridge of the Turtle Mountains, approaching from the west; in SE¼ sec. 5, T. 1, R. 23 W., principal meridian. The station is 2.09 meters northwest of International Boundary Monument 697.

Station mark: A bronze disk set in a flat stone flush with the ground.

**Steele 2** (North Dakota, Bottineau County; O. B. French, 1912).—About 1¼ miles south of International Boundary Monument 692; on the highest point on the highest of several hills; in NE¼ sec. 4, T. 163 N., R. 77 W., fifth principal meridian.

Station mark: The surface mark is a cross, the lines of which are about 5 inches long, cut in a boulder. The subsurface mark, 15 inches lower, is a similar cross cut in a boulder. This station is likely to have rocks piled over it.

**Rock** (North Dakota, Bottineau County; O. B. French, 1912).—About 1½ miles southeast of International Boundary Monument 692; in NE¼ sec. 3, T. 163 N., R. 77 W., fifth principal meridian; on the top of the highest knoll in the vicinity. The greater part of the top of the knoll is covered by a large pile of boulders. The station is on the northwest side of this rock pile, about 2 meters distant from it.

Station mark: The surface mark is a cross, with 5-inch lines, cut in a large boulder set flush with the surface of the ground. The subsurface mark, 15 inches below the top mark, is a similarly marked boulder.

**Souris West Base** (North Dakota, Bottineau County; O. B. French, 1912; 1918).—About 600 meters southeast of International Boundary Monument 691; on the road north of sec. 32, T. 164 N., R. 77 W., fifth principal meridian, 2.93 meters south of the center of the road, beside a farmyard. The station is on range with a pump under a windmill and the extreme southwest edge of a large pile of boulders in a pasture. It is also on range with the northeast corner of the nearest shed from which it is 78.0 meters distant and the northwest corner of a smaller shed.

Station mark: The surface mark is a cross on the flat side of a boulder about 2.5 by 1.5 by 0.7 feet set an inch or two lower than the level of the yard. The subsurface mark is a cross on the flat side of a small boulder about 2 feet below the surface. The reference mark is the northwest corner of a barn, 36.4 meters from the station in azimuth 306°.

**Souris East Base** (North Dakota, Bottineau County; O. B. French, 1912; 1918).—About 600 meters southwest of International Boundary Monument 692; on the road north of sec. 33, T. 164 N., R. 77 W., fifth principal meridian, on the first steep rise as seen from the west. The road runs through the crest of the hill in a cut about 4 feet deep and the station is on the south side of the cut, 5.60 meters from the center of the road.

Station mark: The surface mark is a cross cut in a red granite boulder, 6 by 6 by 18 inches, set on end with the larger end down and projecting about 4 inches above the surface of the ground. The subsurface mark is a cross cut in the center of a flat slab of limestone, 9 by 9 inches, 2.4 feet below the surface of the ground. The reference marks are two piles of small boulders 44.40 and 31.10 meters from the station, in azimuths 26° and 304°, respectively. Another reference mark is an arrow cut in a large, flat boulder planted level with the ground, 2.44 meters from the station in azimuth 100°.

**Center XVII** (Manitoba, Souris District; J. J. McArthur, 1910; 1919).—In the northwest corner of sec. 1, T. 1, R. 23 W., on a heavily timbered ridge nearly 1 mile north and about one-fourth mile west of International Boundary Monument 699. There is a small lake nearly one-half mile south and a little east of the station.

**Station mark:** The original mark was a wooden hub driven flush with the ground. In 1919 the station was re-marked. The mark is the top of a  $\frac{3}{4}$ -by 14-inch steel drill, the top of which is 3 inches below the surface of the ground and over which is a bronze disk, surmounted by a few small stones. A mound of earth 4 feet in diameter and 2 feet high with a trench around it, was erected over the mark.

**Bois** (Manitoba, Souris District; J. J. McArthur, 1910; 1919).—About  $1\frac{3}{4}$  miles northeast of International Boundary Monument 699; near the center of sec. 7, T. 1, R. 22 W., principal meridian; on a high brushy knob. There is a swamp just southeast of the station, another swamp northwest of the station, and a small lake one-fourth mile southwest of the station.

**Station mark:** The surface mark is a bronze disk set in a granite boulder 10 by 10 by 18 inches, the top of which is 4 inches above the surface of the ground. The subsurface mark is a cross cut in a basaltic boulder 8 by 12 by 16 inches, set with its top face 15 inches below the surface.

**Fish** (Manitoba, Souris District; J. J. McArthur, 1910; 1919).—About three-fourths mile northeast of International Boundary Monument 703; in NW $\frac{1}{4}$  sec. 2, T. 1, R. 22 W., principal meridian; on the northwest corner of a large flat-topped bench or tableland of several acres in extent, covered with high brush and trees. This high land is between Ross (Eramosh) and Margaret Lakes.

**Station mark:** Originally marked by a wooden hub driven flush with the ground. In 1919 the station was re-marked. The surface mark is a bronze disk set in a granite boulder 12 by 12 by 16 inches, its surface about 4 inches above the surface of the ground. The subsurface mark is a cross in the top of a granite boulder 10 by 10 by 10 inches, 1 foot below the surface.

**Field** (North Dakota, Bottineau County; J. J. McArthur, 1910).—About 2 miles south and a little west of International Boundary Monument 704; in SW $\frac{1}{4}$  sec. 6, T. 163 N., R. 74 W., fifth principal meridian, about 120 meters east of the west side of the section.

**Station mark:** A drill hole in rock.

**Ack** (North Dakota, Bottineau County; J. J. McArthur, 1910; 1919).—About  $2\frac{1}{2}$  miles south and a little east of International Boundary Monument 706; on a high, round-topped, brushy knoll; about 90 meters south and 335 meters west of the northeast corner of sec. 10, T. 163 N., R. 74 W., fifth principal meridian, and about 90 meters northwest of the Scandinavian church which is very conspicuous from every direction.

**Station mark:** The original mark was a wooden hub driven flush with the ground. In 1919 the station was re-marked. The surface mark is a bronze disk set in a granite boulder approximately 12 by 12 by 20 inches, set on end. The subsurface mark is a cross in a granite boulder 12 inches in diameter set 20 inches underground.

**Fair** (Manitoba, Souris District; J. J. McArthur, 1910; 1919).—About 2 miles north of the International Boundary, midway between Monuments 706 and 707; on the summit of the most prominent hill in the vicinity; about 150 meters south and about 60 meters east of the northwest corner of sec. 10, T. 1, R. 21 W., principal meridian. There is a small lake about 300 meters east of the station and a hay meadow about 150 meters west of it.

**Station mark:** The original mark was a wooden hub driven flush with the ground. In 1919 the station was re-marked. The surface mark is a bronze disk set in a granite boulder about 10 by 10 by 16 inches, which projects about 4 inches above the surface of the ground, and around which some smaller stones have been placed. The subsurface mark is a cross cut in the top of a black basalt boulder about 8 by 10 by 12 inches set 1 foot underground.

**Worth** (North Dakota, Bottineau County; J. J. McArthur, 1910; 1919).—Nearly 1 mile southwest of International Boundary Monument 712; on the north end of a prominent spur in NE $\frac{1}{4}$  sec. 31, T. 164 N., R. 72 W., fifth principal meridian. There is a large oak tree, visible from a considerable distance, on the east edge of the spur, 7.5 meters from the station.

**Station mark:** The original mark was a wooden hub driven flush with the ground. In 1919 the station was re-marked. The surface mark is a bronze disk set in a granite boulder 10 by 12 by 20 inches, set on end with its top and the disk flush with the ground. The subsurface mark is a cross cut in a granite boulder 8 by 16 by 20 inches, set 20 inches underground.

**Ninga** (Manitoba, Souris District; J. J. McArthur, 1911).—Station lost; see description of station "Ninga H."

**Center XIX** (Manitoba, Souris District; J. J. McArthur, 1911; 1919).—About one-half mile northeast of International Boundary Monument 714 and near the center of sec. 4, T. 1, R. 19 W., principal meridian; on the eastern and highest point of an isolated hill, the highest in the vicinity.

**Station mark:** Originally marked by a wooden hub driven flush with the ground. In 1919 the station was re-marked. The surface mark is a bronze disk set in a granite boulder 10 by 12 by 18 inches, set on end with

the top just below the surface of the ground. The subsurface mark is a cross cut in the top of a granite boulder 6 by 8 by 10 inches, set 24 inches underground.

**Center XX** (Manitoba, Souris District; J. J. McArthur, 1911; 1919).—About one-third mile northwest of International Boundary Monument 718; near the north-and-south center line of sec. 5, T. 1, R. 18 W., principal meridian; on the north end of a prominent isolated hill.

Station mark: Originally marked by a wooden hub driven flush with the ground. In 1919 the station was re-marked. The surface mark is a bronze disk set in a granite boulder 8 by 10 by 20 inches, set on end with its top flush with the surface of the ground. The subsurface mark is a cross cut in a basaltic boulder 6 by 16 by 18 inches, set 20 inches underground.

**St. Johns** (North Dakota, Rolette County; J. J. McArthur, 1911; 1919).—About three-fourths mile south and a little east of International Boundary Monument 719; in NE¼ sec. 35, T. 164 N., R. 71 W., fifth principal meridian; on the highest point of a flat-topped brushy hill on the last high eastern spur of the Turtle Mountains.

Station mark: The original mark was a wooden hub driven flush with the ground. In 1919 the station was re-marked. The surface mark is a bronze disk set in a granite boulder 8 by 12 by 16 inches, set on end with its top flush with the surface of the ground. The subsurface mark is a cross in a granite boulder 6 by 10 by 10 inches, set 24 inches underground.

**Bannerman North Base** (Manitoba, Souris District; J. J. McArthur, 1911; 1919).—On the southwest side of the Great Northern Railway about one-fourth mile southeast of the town of Bannerman; on the top of the first high ground south of a railway fill across some low ground. The station is 1 meter outside the railway fence, between the last two telegraph poles on the southwest side of the track, and is 15.47 meters southwest of the center of the southwest rail of the track.

Station mark: The original station was recovered in 1912 and re-marked. The surface mark is a cross cut in a reddish granite boulder about 12 by 14 by 24 inches, set flush with the surface of the ground. The subsurface mark is a cross cut in a similar boulder, the top of which is 14 by 18 inches, set 30 inches underground.

**East** (Manitoba, Souris District; J. J. McArthur, 1911).—About 2¼ miles north of International Boundary Monument 720; on the highest point of a ridge running north and south in NE¼ sec. 14, T. 1, R. 18 W., principal meridian; about 1¼ miles east and a little south of Bannerman railway station.

Station mark: A drill hole in a boulder.

**Bannerman South Base** (Manitoba, Souris District; J. J. McArthur, 1911; 1919).—On the southwest side of the Great Northern Railway, on the highest ridge that crosses the railway between Bannerman and the International Boundary, and about 1 mile along the railway from the boundary; near the center of sec. 1, T. 1, R. 18 W., principal meridian. The station is 15.40 meters southwest of the southwest rail of the track. At this point the track lies in a cut and the station is about 15 feet above it. The station is 1.2 meters southwest of the railway fence.

Station mark: The original station was recovered in 1912 and was re-marked. The surface mark is a cross with 4-inch lines cut in a large reddish granite boulder. The subsurface mark is a cross in a similar boulder buried 22 inches below the surface mark.

**Center XXI** (Manitoba, Souris District; J. J. McArthur, 1911; 1919).—About one-half mile north of the International Boundary, midway between Monuments 722 and 723; on the south edge of a flat-topped rise of land just west of McGillis Creek near the center of sec. 5, T. 1, R. 17 W., principal meridian.

Station mark: The original mark was a wooden hub driven flush with the ground. In 1919 the station was re-marked. The surface mark is a bronze disk set in a circular concrete block 10 inches in diameter and 20 inches long, set with its top slightly below the surface of the ground. The subsurface mark is a cross cut in a granite boulder 8 by 10 by 12 inches, set with its top 26 inches underground.

**Rolla** (North Dakota, Rolette County; J. J. McArthur, 1911).—A little more than 1 mile south of the International Boundary, midway between Monuments 723 and 724; in SW¼ sec. 36, T. 164 N., R. 70 W., fifth principal meridian; on the west end of the highest noticeable short ridge.

Station mark: A drill hole in rock.

**Lena** (Manitoba, Souris District; J. J. McArthur, 1911; 1919).—About 2¼ miles north of the International Boundary, midway between Monuments 723 and 724; on the highest point of a noticeable hill in SW¼ sec. 15, T. 1, R. 17 W., principal meridian.

Station mark: The original mark was a wooden hub driven flush with the ground. In 1919 the station was re-marked. The surface mark is a bronze disk set in the top of a circular concrete block 10 inches in diameter and 18 inches long, set with the top 4 inches below the surface of the ground. The subsurface mark is a cross cut in a stone 6 by 10 by 10 inches set with its top face 24 inches underground.

**Enter** (Manitoba, Souris District; J. J. McArthur, 1911; 1919).—About 2 miles north of International Boundary Monument 726; on top of a prominent knoll on the east-and-west section-line road, about 90 meters east of the southwest corner of sec. 17, T. 1, R. 16 W., principal meridian. The station is about 180 meters south-east of a yellow farmhouse.

**Station mark:** Originally marked by a wooden hub driven flush with the ground. The station was re-marked in 1919. The surface mark is a bronze disk set in a concrete post 8 inches in diameter and 24 inches long, set with its top flush with the ground. The subsurface mark is an iron bolt set in a concrete block 6 inches in diameter and 12 inches long set with its top 24 inches underground.

**Prise** (North Dakota, Rolette County; J. J. McArthur, 1911; 1919).—About 1½ miles south of the International Boundary, midway between Monuments 726 and 727; on the first prominent rise of ground about 300 meters west of the southeast corner of sec. 34, T. 164 N., R. 69 W., fifth principal meridian; on the south side of the road south of that section. There is a schoolhouse at the section corner, and a red barn about 240 meters nearly due north of the station.

**Station mark:** Originally marked by a wooden hub driven flush with the ground. The station was re-marked in 1919. The surface mark is a bronze disk set in the top of a concrete post 7 inches in diameter and 22 inches long, with its top 5 inches below the surface of the ground. The subsurface mark is an iron bolt set in the top of a concrete post 6 inches in diameter and 14 inches long, set with its top 27 inches underground. One reference mark is a telephone pole 11.7 meters southwest of the station and a second reference mark is a large boulder 16.2 meters northeast of the station.

**Center XXIII** (Manitoba, Souris District; J. J. McArthur, 1911; 1919).—On the road allowance south of sec. 3, T. 1, R. 16 W., principal meridian, 2.90 meters northwest of International Boundary Monument 728.

**Station mark:** Originally marked by a wooden hub. The station was re-marked in 1919. The surface mark is a bronze disk set in a granite boulder 10 by 10 by 10 inches, set with its top about 4 inches below the surface of the ground. The subsurface mark is a cross cut in the top of a triangular stone 6 inches thick with sides 14 inches long, placed 20 inches underground.

**Field** (North Dakota, Towner County; J. J. McArthur, 1911; 1919).—About 1½ miles southeast of International Boundary Monument 730; on the northern part of a flat-topped rise of some prominence in the SW¼ sec. 33, T. 164 N., R. 68 W., fifth principal meridian. A slight mound or knoll distinguishes the point where the station is from other portions of the rise of land.

**Station mark:** Originally marked by a wooden hub. The station was re-marked in 1919. The surface mark is a bronze disk set flush with the ground in a stone 6 by 10 by 16 inches. The subsurface mark is a cross cut in a stone 6 by 10 by 10 inches, set 20 inches underground.

**Hans** (North Dakota, Towner County; J. J. McArthur, 1911; 1919).—About 1½ miles south of the International Boundary, nearly midway between Monuments 734 and 735; on the highest part of a sharp gravel knoll in NW¼ sec. 4, T. 163 N., R. 67 W., fifth principal meridian. There is a cut about 10 feet deep through the knoll just east of the station. A large red barn and farmhouse are about 210 meters north of east from the station and there is another large red barn north of west from the station.

**Station mark:** Originally marked by a wooden hub. The station was re-marked in 1919. The surface mark is a bronze disk set in a stone 10 by 14 by 18 inches, the top of which is flush with the surface of the ground. The subsurface mark is a cross cut in a stone 8 by 12 by 16 inches, set 24 inches underground.

**Ridge** (North Dakota, Towner County; J. J. McArthur, 1911; 1919).—About 1½ miles south of International Boundary Monument 742; on a gravel ridge about 60 meters north and about 240 meters west of the southeast corner of sec. 34, T. 164 N., R. 66 W., fifth principal meridian. There is a gravel pit just east of the station.

**Station mark:** Originally marked by a wooden hub. The station was re-marked in 1919. The surface mark is a bronze disk set in a granite boulder 14 by 16 by 20 inches, flush with the ground. The subsurface mark is a cross cut in a granite boulder 8 by 14 by 14 inches, set 20 inches underground. One reference mark is a cross on a stone 8 by 8 by 19 inches set flush with the ground in a fence line 36.1 meters north of a fence corner. This reference mark is 42.7 meters southeast of the station. A second reference mark is a cross on a stone set in a fence line flush with the ground 34.0 meters from the same fence corner. This reference mark is 51.7 meters south of the station. The angle between the stones at the station is 60°19'; the distance between the stones is 48.06 meters. The angle at the southeast stone from the south stone to the station is 69°13'; the angle at the south stone from the station to the southeast stone is 50°28'.

**City** (Manitoba, Lisgar District; J. J. McArthur, 1911).—About 2¾ miles north of International Boundary Monument 756; on a noticeable hill at the northeast corner of SE¼ sec. 17, T. 1, R. 11 W., principal meridian. **Station mark:** A drill hole in a boulder.

**Hannah** (Manitoba, Lisgar District; North Dakota, Cavalier County; J. J. McArthur, 1911; 1912).—On top of an old earth mound on a rise of land on the International Boundary about 335 meters west of Monument 764.

Station mark: Originally marked by a wooden hub. The station was re-marked in 1912. The surface mark is a cross cut in a boulder the top of which is flush with the surface of the ground. The subsurface mark is a cross cut in a boulder the top of which is 16 inches underground.

**Hannah North Base** (Manitoba, Lisgar District; O. B. French, 1912; 1919).—About  $2\frac{1}{2}$  miles almost due north of International Boundary Monument 765; on a slight rise in the ground on the road allowance between secs. 13 and 14, T. 1, R. 10 W., principal meridian.

Station mark: A bronze disk set in a large boulder the top of which is flush with the surface of the ground. The subsurface mark is a cross with 4-inch lines cut in a boulder the top of which is one-half meter below the surface of the ground. Two reference marks are large boulders, distant 38 and 39 meters respectively from the station, a very little east of due south. Another reference mark is the fence corner at the southwest corner of NE $\frac{1}{4}$  sec. 13, T. 1, R. 10 W., principal meridian, 51.80 meters from the station in azimuth 175°. The bronze disk for the surface mark was set in 1919.

**Hannah South Base** (Manitoba, Lisgar District; O. B. French, 1912; 1919).—About two-thirds mile nearly due north of International Boundary Monument 765; on the first prominent little ridge which crosses the road allowance between secs. 1 and 2, T. 1, R. 10 W., principal meridian. The station is about 2 meters east of the fence on the west side of the road allowance. About 100 meters north of the station is an area of low ground very wet in wet weather.

Station mark: A bronze disk set in a reddish boulder, 1 foot in diameter at the top and 2 feet in depth, the top of which is flush with the surface of the ground. The subsurface mark is a cross with 4-inch lines cut in a large boulder the top of which is  $2\frac{1}{4}$  feet underground. The bronze disk was set in 1919.

**Haskett North Base (Mark)** (Manitoba, Lisgar District; O. B. French, 1912; 1919).—About 3 miles almost due north of International Boundary Monument 797, and near the northeast corner of NW $\frac{1}{4}$  sec. 18, T. 1, R. 4 W., principal meridian; 11.40 meters northeast of the center of the east rail of the Great Northern Railway, 141 meters south along the railroad from the south side of the road allowance to the north.

Station mark: A cross cut in a stone, about 6 inches thick and 10 inches in diameter, the top of which is slightly below the surface of the ground. The subsurface mark is a similarly marked stone 0.44 meter below the upper stone.

**Haskett South Base (Mark)** (Manitoba, Lisgar District; O. B. French, 1912; 1919).—About 700 meters northeast of International Boundary Monument 798; in SE $\frac{1}{4}$  sec. 5, T. 1, R. 4 W., principal meridian; 11.40 meters from the center of the east rail of the Great Northern Railway; about 200 meters north of the north end of the trestle over the one small water hole north of the International Boundary.

Station mark: A cross in the top of a granite boulder 10 inches in diameter, the top of which is a little below the surface of the ground. The subsurface mark is a similarly marked granite boulder, the top of which is one-half meter underground.

**Cross** (North Dakota, Pembina County; J. J. McArthur, 1911).—About one-half mile southeast of International Boundary Monument 810; on a noticeable rise in sec. 25, T. 164 N., R. 55 W., fifth principal meridian, about 90 meters east of the west boundary of the section and about 640 meters south of the International Boundary.

Station mark: A drill hole in a boulder.

**Neché** (Manitoba, Lisgar District; O. B. French, 1912; 1919).—About one-half mile southwest of the town of Gretna; in the southwest corner of sec. 5, T. 1, R. 1 W., principal meridian; 20.5 meters northeast of International Boundary Monument 816.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set flush with the surface of the ground in the top of a cylinder of concrete 1 foot in diameter and 2 feet in depth. The subsurface mark is a  $3\frac{1}{2}$ -inch wire nail set upright in a core of cement 2 inches below the bottom of the concrete cylinder.

**Neché West Base** (Manitoba, Lisgar District; O. B. French, 1912; 1919).—About 4 meters north of the International Boundary, and about 350 meters west of Monument 817; in the road allowance south of SE $\frac{1}{4}$  sec. 5, T. 1, R. 1 W., principal meridian.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in the top of a cylindrical concrete pier 11 inches in diameter, but flaring to 13 inches in diameter, and 2 feet long, its top flush with the surface of the ground. The subsurface mark is a  $3\frac{1}{2}$ -inch wire nail standing perpendicularly in a core of cement, the head of the nail being about 2 inches below the concrete pier.

**Neché East Base** (Manitoba, Lisgar District; O. B. French, 1912; 1919).—Just north of the International Boundary about 520 meters east of Monument 818; in the road allowance south of SW $\frac{1}{4}$  sec. 3, T. 1, R. 1 W., principal meridian.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in the top of a block of concrete about 18 inches deep, 20 inches in diameter at the base and 12 inches at the top which is flush with the ground. The subsurface mark is the head of a twentypenny nail set in a bed of concrete at a depth of about 20 inches underground.

**Nash** (North Dakota, Pembina County; J. J. McArthur, 1911; 1919).—About  $1\frac{1}{2}$  miles south of International Boundary Monument 830; on the north limit of the road along the south side of sec. 32, T. 164 N., R. 51 W., fifth principal meridian; about 610 meters west of the Northern Pacific Railway. The station is between the twelfth and thirteenth electric light poles on the south side of the roadway, the former being 26.2 meters to the southeast and the latter 33.3 meters to the southwest. The nearest telephone pole on the north side of the road is 11.2 meters to the east and 0.6 meter to the north.

Station mark: A bronze disk set in the top of a concrete post 12 inches square and 3 feet long, the top of the post just below the surface of the ground and covered with soil.

**Wet** (Manitoba, Provencher District; J. J. McArthur, 1911; 1928).—About 2 miles north of International Boundary Monument 831, and about 46 meters west of the Canadian National Railway; on the south side of the road along the north side of sec. 10, T. 1, R. 1 E., principal meridian.

Station mark: A bronze disk set in the top of a concrete block.

**Barnet** (Minnesota, Kittson County; C. H. Sinclair, 1912; 1928).—About  $1\frac{1}{2}$  miles south of International Boundary Monument 834; 364 meters east of the road on the west side, and 10.5 meters north of the center of the road on the south side of sec. 31, T. 164 N., R. 50 W., fifth principal meridian.

Station mark: A bench-mark post set in cement, the top 0.4 meter above ground.

**Elkins** (Manitoba, Provencher District; C. H. Sinclair, 1912).—About 2 miles almost due north of International Boundary Monument 835; on the south side of the road, about 400 meters west of the northeast corner of sec. 7, T. 1, R. 3 E., principal meridian; about 1 meter south of the line of telephone poles.

Station mark: A bronze disk set in cement.

**Finney** (Minnesota, Kittson County; C. H. Sinclair, 1912).—About  $1\frac{1}{2}$  miles almost due south of International Boundary Monument 839; 17.6 meters west of the center of the road on the east side of sec. 35, T. 164 N., R. 50 W., fifth principal meridian; and 113 meters north of the center of the road along the south side of that section.

Station mark: A bench-mark post set in a mass of concrete 3 feet in the ground.

**Shultz** (Manitoba, Provencher District; C. H. Sinclair, 1912; 1928).—About 2 miles almost due north of International Boundary Monument 839; about 490 meters west of the southeast corner of sec. 14, T. 1, R. 3 E., principal meridian; and on the north side of the road.

Station mark: A bench-mark post set in a mass of concrete.

**Humboldt** (Minnesota, Kittson County; C. H. Sinclair, 1912).—About one-half mile east of the town of Humboldt, on the south side of a road 5.6 miles south of the International Boundary. The station is in a small swale, about 3.7 meters west of a small drainage ditch, 90 meters from the center of an east-and-west road and 342 meters east of the center of a north-and-south road.

Station mark: A bronze disk set in a mass of concrete 18 by 8 by 8 inches.

**Joe** (Minnesota, Kittson County; C. H. Sinclair, 1912; 1928).—About  $1\frac{1}{4}$  miles south of International Boundary Monument 844; in sec. 2, T. 163 N., R. 49 W., fifth principal meridian; about 200 meters north of a small coulee, and in line with the prolongation of the road between secs. 2 and 3, T. 1, R. 4 E., principal meridian, on the Canadian side. A 30-foot tower was erected at this station to see north and east.

Station mark: A bench-mark post set 3 feet deep in concrete, 1 foot being above ground.

**Schrader** (Manitoba, Provencher District; C. H. Sinclair, 1912; 1928).—About 2 miles north of International Boundary Monument 844, and very near the southeast corner of sec. 15, T. 1, R. 4 E., principal meridian.

Station mark: A bronze disk set in a stone. An arrow, cut in a stone, points to the station distant 0.43 meter. The station mark and stone are both 4 inches underground.

**Orleans** (Minnesota, Kittson County; C. H. Sinclair, 1912; 1928).—About one-half mile northeast of the town of Orleans and 4.6 miles south of International Boundary Monument 846; in sec. 19, T. 163 N., R. 48 W., fifth principal meridian; about 200 meters south of an old house and barn, and about 32 meters south of the center of the road.

Station mark: A bronze disk set in concrete with stones piled around it.

**Kraska** (Minnesota, Kittson County; C. H. Sinclair, 1912; 1928).—On a sand ridge nearly 2 miles almost due south of International Boundary Monument 851, in sec. 2, T. 163 N., R. 48 W., fifth principal meridian. The station is about 100 meters west of the road, 25 meters north of a wire fence, 5 meters west of another fence, and 53 meters northeast of a barn.

Station mark: A bench-mark post set in concrete, 3 feet in the ground.

**Shock** (Manitoba, Provencher District; C. H. Sinclair, 1912; 1928).—On a small ridge 2 miles almost due north of International Boundary Monument 851, and about one-fourth mile east of a schoolhouse; near the center of the north side of sec. 11, T. 1, R. 5 E. A Galician house is south-southeast about 130 meters.

Station mark: A bench-mark post set in concrete 1 foot in diameter, 3 feet in, and 1 foot out of the ground.

**Casa** (Manitoba, Provencher District; C. H. Sinclair, 1912; 1928).—About 2 miles north of International Boundary Monument 857, on very rocky ground 8 meters northeast of the southwest corner of sec. 14, T. 1, R. 6 E., principal meridian. There is a swamp one-fourth mile to the east and a house one-fourth mile south-southeast.

Station mark: A bench-mark post surrounded with concrete at the surface of the ground. An arrow cut in a boulder is 2.064 meters from the station in azimuth  $191^{\circ}$  magnetic. A second arrow cut in a boulder is 2.291 meters from the station in azimuth  $148^{\circ}$  magnetic.

**Wood** (Minnesota, Kittson County; C. H. Sinclair, 1912; 1928).—About 2 miles almost due south of International Boundary Monument 857; on flat sandy land in sec. 1, T. 163 N., R. 47 W., fifth principal meridian, 5.50 meters east of the quarter-section post on the west side of the section.

Station mark: A bench-mark post set 3 feet in the ground with 1 foot of concrete 10 by 10 inches at the surface of the ground around it.

**Soft** (Manitoba, Provencher District; C. H. Sinclair, 1912; 1928).—About  $2\frac{3}{4}$  miles north of the International Boundary, midway between Monuments 860 and 861; about 100 meters north of the quarter-section line and about 150 meters west of the east side of sec. 17, T. 1, R. 7 E., principal meridian, and about 200 meters northwest of some houses. The station is located on the northwest corner of a large clump of poplars on the north and west of which is a swamp.

Station mark: A bench-mark post set 3 feet in the ground and surrounded at the surface with 1 foot of concrete.

**Kelson** (Minnesota, Kittson County; C. H. Sinclair, 1912; 1928).—About  $1\frac{1}{2}$  miles nearly due south of International Boundary Monument 861; on a grassy flat on the west edge of a small swamp; near the section line between secs. 33 and 34, T. 164 N., R. 46 W., fifth principal meridian, and about 200 meters north of the south line of the said sections.

Station mark: A bench-mark post set 3 feet in the ground and surrounded at the surface with 1 foot of concrete.

**Vita** (Manitoba, Provencher District; C. H. Sinclair, 1912; 1928).—About  $4\frac{1}{2}$  miles north of International Boundary Monument 864; about 50 meters west and 500 meters north of the southeast corner of sec. 26, T. 1, R. 7 E., principal meridian.

Station mark: A bronze disk in a concrete block 10 by 10 by 12 inches set firmly in the ground. The reference mark is an arrow, pointing toward the station, cut in a boulder 10 feet in diameter and 5 feet above the surface of the ground, 27.03 meters from the station in azimuth  $66^{\circ}35'$ .

**Roseau** (Manitoba, Provencher District; Minnesota, Kittson County; C. H. Sinclair, 1912; 1928).—On a slight ridge on the International Boundary 515 meters east of Monument 864.

Station mark: A cross cut in a 200-pound rock set firmly in the ground.

**Caliento** (Manitoba, Provencher District; C. H. Sinclair, 1912; 1928).—About  $4\frac{3}{4}$  miles north of International Boundary Monument 871, in NW $\frac{1}{4}$  sec. 19, T. 1, R. 9 E., principal meridian; on the south side of a peninsula which projects eastward into a swamp and which terminates about 120 meters to the east. The station is about 210 meters east of the west side of the section and about one-half mile north of a forested area.

Station mark: A bench-mark post set in concrete, 3 feet in the ground. The reference marks are: A tamarack tree 4.1 meters from the station in azimuth  $295^{\circ}$ ; a rock 20.6 meters from the station in azimuth  $202^{\circ}$ ; and a rock 25.0 meters from the station in azimuth  $200^{\circ}$ .

**Suran** (Manitoba, Provencher District; C. H. Sinclair, 1912; 1928).—Nearly 1 mile north of International Boundary Monument 877; on a sandy ridge on the east side of the road along the west line of sec. 6, T. 1, R. 10 E., principal meridian; and about 16 meters south of the traveled road running eastward. The station is about 25 meters northwest of the residence of the parish priest.

Station mark: A bronze disk set in concrete.

**Sundown** (Manitoba, Provencher District; C. H. Sinclair, 1912; 1928).—About  $5\frac{1}{4}$  miles north of International Boundary Monument 877; near the northeast corner of SW $\frac{1}{4}$  sec. 31, T. 1, R. 9 E., principal meridian, 6 meters east of the quarter-section line; among small poplars, about 70 meters south of the edge of an open swamp.

Station mark: A bronze disk set in concrete.

**Duxby** (Minnesota, Roseau County; C. H. Sinclair, 1912; 1928).—Near the post office in the town of Duxby; in SW $\frac{1}{4}$  sec. 26, T. 163 N., R. 42 W., fifth principal meridian; about 100 meters south of Roseau River, 90 meters east of the store and post office, and in the south track of the traveled road.

Station mark: A bronze disk set in concrete.



**Wampum** (Manitoba, Provencher District; C. H. Sinclair, 1912; 1928).—About 1 mile north of the International Boundary, midway between Monuments 892 and 893; on a high ridge southwest of Canadian National Railway station Wampum; 35 meters south and 1 meter east of the northeast corner of sec. 1, T. 1, R. 12 E., principal meridian.

Station mark: A bronze disk set in concrete.

**Sandy** (Minnesota, Roseau County; C. H. Sinclair, 1912; 1928).—About  $9\frac{1}{4}$  miles south of the International Boundary; on a sandy ridge about 30 meters south of the northwest corner of sec. 17, T. 162 N., R. 40 W., fifth principal meridian; on the east side of the road limit.

Station mark: A bronze disk set in concrete.

**Salol** (Minnesota, Roseau County; C. H. Sinclair, 1912; 1928).—On the south side of the Great Northern Railway, 350 meters west of Salol station, 25 meters south of the railway track, between the railway and the highway, and 30 meters east of a north-and-south road. The station is on line with a church steeple and the kitchen window of Gustofson's house, both south of the station.

Station mark: A bronze disk set in a concrete block 10 by 10 by 18 inches in size.

**Guibo** (Minnesota, Roseau County; C. H. Sinclair, 1912; 1928).—On a sandy ridge 3 miles west of Warroad; about one-fourth mile south of the Great Northern Railway, and nearly due south of a house just north of the railway. The station is in SE $\frac{1}{4}$  sec. 26, T. 163 N., R. 37 W., fifth principal meridian, 50 meters east of the road on the north-and-south midsection line, and about 400 meters north of the south line of the section.

Station mark: A bronze disk set in a concrete block 8 by 8 by 16 inches in size.

**Gull Island** (Minnesota, Lake of the Woods County; C. H. Sinclair, 1913).—On the southern part of Lake of the Woods, on Cormorant Rock, a large rock in the lake, about  $3\frac{1}{2}$  miles west of Long Point, and about  $1\frac{1}{2}$  miles north of Rocky Point.

Station mark: A drill hole in the rock. Three other drill holes used for fastening signal guys are equally spaced about the station mark a few feet distant.

**Gould** (Manitoba, Provencher District; C. H. Sinclair, 1913).—On the west side of Lake of the Woods, about 1 mile south of the mouth of Reed River on the west shore of Buffalo Bay. The station is about 200 meters inland and is near the quarter post on the east line of sec. 18, T. 2 N., R. 17 E., fifth principal meridian. The station is surrounded by heavy timber.

Station mark: A bronze disk marked "U. S. & C. B. S." set in concrete flush with the ground.

#### GEORGIA STRAIT TO SUMMIT OF ROCKY MOUNTAINS, MINOR SCHEMES

**Sumas Mountain** (Washington, Whatcom County; E. C. Barnard, 1905).—About 5 miles east of Everson, on the north spur of Sumas Mountain, better known as Nooksack Mountain. This spur runs northward from a flat summit, and the station is about one-half mile down it on a bare spot just east of which there is a steep bluff. The station is 200 feet lower than the highest point of the mountain. It can be best reached from the north.

Station mark: A cross in a stone set level with the surface of the ground. The reference mark is a bronze disk set in solid rock, 2.3 meters from the station in azimuth  $235^{\circ}38'$ .

**Chilliwack** (British Columbia, Fraser Valley District; J. J. McArthur, 1906; 1935).—On the western and lower summit of Sumas Mountain, about 10 miles west of Chilliwack and on the west side of the steep ravine about 1 mile west of the Sumas pumping station. The station is on an exposed rock in a circular grassy patch, about 30 meters in diameter, which is surrounded by trees. Elevation, about 2,600 feet.

Station mark: A bronze disk, 2 inches in diameter, with a triangle at the center.

**Black** (Washington, Whatcom County; G. T. Prinsep, 1935).—On the summit at the north end of Black Mountain, about 5 miles southwest of Cultus Lake. There is no trail up this mountain. In 1935 it was ascended from the ridge which extends toward International Boundary Monument 44. The mountain side has been burned over about half way to the top, and the dead trees which have fallen over make that part of the climb difficult. Elevation, about 5,000 feet.

Station mark: A nail in a wooden hub covered by a pile of stones. Station "Black" in this vicinity, established in 1906 and marked by a bronze disk, was not recovered in 1935.

**Vedder** (British Columbia, Fraser Valley District; Geodetic Survey of Canada, 1925; 1935).—On the highest part of the rocky ridge on Vedder Mountain, about 2 miles northwest of Cultus Lake.

Station mark: A standard Geodetic Survey of Canada station-mark disk leaded in solid rock. There are 2 standard reference-mark disks: the first is 12.66 meters from the station in azimuth  $35^{\circ}39'$ ; the second is 4.51 meters from the station in azimuth  $94^{\circ}42'$ .

**Liumchen** (British Columbia, Fraser Valley District; G. T. Prinsep, 1935).—On the highest part of the rugged ridge between the end of the Liumchen trail on the Canadian side of the boundary and the Canyon Ridge trail on the United States side. The station is most easily accessible from the Canyon Ridge trail. It is a few feet from the north side of the bluff that drops precipitously in all directions except the south. It is 240.9 meters from International Boundary Monument 48, in azimuth 200°47'.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in a drill hole in solid rock.

**Thurston** (British Columbia, Fraser Valley District; J. H. Kihl, 1935).—On the highest point on a ridge between the Fraser Valley and Chilliwack River, northeast of McGuire Mountain.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in a boulder. Station "Thurston", on this ridge, marked by J. J. McArthur in 1908 by a bronze disk set in a boulder, was not recovered in 1935.

**McGuire** (British Columbia, Fraser Valley District; J. J. McArthur, 1906; 1935).—On the highest part of McGuire Mountain, about 5 miles southeast of the junction of Chilliwack River and Tamihi Creek. In 1935 the mountain was climbed from Tamihi Creek, near International Boundary Monument 50 and the station was approached along the ridge which is alternately covered with patches of heather and woods. The narrow summit is of friable rock; it slopes steeply in all directions except the southeast, where a narrow nose of jagged rock connects it with the lower ridge. Elevation, about 6,600 feet.

Station mark: A bronze disk 2 inches in diameter with a triangle in the center, set in a drill hole in bed rock.

**Balan** (British Columbia, Fraser Valley District; G. T. Prinsep, 1935).—About 3 miles south of McGuire Mountain and 1 mile south of Tamihi Creek. The station is on the nose of a low thickly wooded ridge extending northeast from the Canyon Ridge trail, midway between International Boundary Monuments 49 and 50. There are three vistas cut over the nose, and the station is in the most northern of them.

Station mark: A nail in a hub driven in the shaly ground with a small cairn over it.

**Camas** (British Columbia, Fraser Valley District; G. T. Prinsep, 1935).—On the ridge between McGuire and Red Mountains, about 2 miles southeast of McGuire. The station is on a rock bluff about 100 feet below the heather-covered culminating point of the ridge.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark cemented in a drill hole in the bed rock.

**Slesse** (British Columbia, Fraser Valley District; J. H. Kihl, 1935).—On the summit of the third peak from the north, on a high ridge east of Silesia (Slesse) Creek, about 4 miles north of International Boundary Monument 54. From a point on the old Chilliwack Lake trail about 2 miles east of Silesia Creek a side trail leads up to a mining claim at Upper Pierce Lake. The ridge on the north side of this lake leads west and directly to the station.

Station mark: A rock drill, driven into the shaly rock surface, over which a 5-foot cairn was erected. Station "Silicia", on this peak, marked by J. J. McArthur in 1908 by a bronze disk, was not recovered.

**Red** (Washington, Whatcom County; J. H. Kihl, 1935).—On the summit of Red Mountain, 1½ miles south of the International Boundary and midway between Silesia Creek and Tamihi Creek. The station can be reached from the Red Mountain Mine near International Boundary Monument 54 by crossing the snowfield and climbing the glacier (which lies on the east side of the Red Mountain ridge) to the top of that ridge and then proceeding around to the southwest side of Red Mountain and thence up to its highest point. The final approaches to both this mountain and Monument 53 must be from the west; they can probably be more easily reached from Tamihi Creek than from Silesia Creek.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark cemented into the rock, over which a 5-foot cairn was erected. Station "Red", on this mountain, marked by J. J. McArthur in 1908 by a bronze disk, was not recovered in 1935.

**Silver** (British Columbia, Fraser Valley District; J. J. McArthur, 1908; 1935).—On the summit of Silver Mountain, a high conical peak north of Chilliwack Lake. The station can be reached in 6 hours, from a point on the Chilliwack Lake trail about 2 miles west of the lake.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark cemented into an old drill hole which was assumed to be the position of the original station and within a few feet of which the bronze disk set in 1905 to mark the station was found lying.

**D** (British Columbia, Fraser Valley District; J. H. Kihl, 1935).—On the ridge between Silesia Creek and Middle Creek, about 2 miles northeast of International Boundary Monument 55. There are six high peaks on this ridge and station "D" is on the fifth peak from the north. The three highest and most northern of these peaks are known as Pierce, Needle, and Canadian Tamihi Peaks. The station can be reached from Monument 55 by following the burnt-over ridge leading northeast to the foot of the peak, which can be climbed from the west side only. The station is about 5,000 feet above station "Power", which is on the bank of Silesia Creek.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark cemented into the rock, over which a 4-foot cairn was erected.

**E** (British Columbia, Fraser Valley District; J. H. Kihl, 1935).—On the peak about 120 meters north of International Boundary Monument 56. It can be reached from Monument 55 by going northeast to the top of the ridge and thence south along the ridge to the station.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark cemented into the rock.

**North** (British Columbia, Fraser Valley District; J. H. Kihl, 1935).—At the south end of the second highest peak on the ridge north of the draw which leads northeast from Silesia Creek at International Boundary Monument 55.

Station mark: A drill hole in rock.

**South** (British Columbia, Fraser Valley District; J. H. Kihl, 1935).—On the ridge south of the draw which leads northeast from International Boundary Monument 55. The station is distant from the monument about  $1\frac{1}{2}$  miles and is about one-half mile north of the boundary midway between Monuments 55 and 56.

Station mark: A drill hole in rock.

**Power** (Washington, Whatcom County; J. H. Kihl, 1935).—Just south of the International Boundary on the east side of Silesia Creek. The station is about 120 meters southeast of Monument 55, and is 3.54 meters from the northeast corner of the cabin at the power plant.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark cemented into a boulder 4 feet in diameter, which protrudes about 2 feet above the surface of the ground.

**F** (Washington, Whatcom County; J. H. Kihl, 1935).—About 140 meters south of the International Boundary, on the peak about 1 mile west of Monument 57.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark, cemented into the rock, over which a 5-foot cairn was erected.

**G** (British Columbia, Fraser Valley District; J. H. Kihl, 1935).—On the high peak about 2 miles north and a little east of International Boundary Monument 58.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark, cemented into the rock, over which a 5-foot cairn was erected.

**Cope** (British Columbia, Fraser Valley District; J. H. Kihl, 1935).—On high ground about 100 meters northwest of International Boundary Monument 59 and immediately north of a very large boulder which can be seen from the monument.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark cemented into solid surface rock.

**Middle** (Washington, Whatcom County; J. J. McArthur, 1908; 1935).—On a sharp peak one-third mile south of International Boundary Monument 60, overlooking Hanging Lake.

Station mark: A bronze disk set in rock in 1908.

**J** (British Columbia, Fraser Valley District; J. H. Kihl, 1935).—On the north knob of the second peak from the north on the ridge running from the Chilliwack River along the west side of Chilliwack Lake; about  $2\frac{1}{2}$  miles north of the International Boundary.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark cemented into the rock.

**H** (British Columbia, Fraser Valley District; J. H. Kihl, 1935).—On the southern part of a high peak three-fourths mile north of International Boundary Monument 60 and on the same ridge. It may be reached by following the ridge from Monument 60 to the north side of a deep saddle in the ridge.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark cemented into the rock.

**L** (British Columbia, Fraser Valley District; D. J. Fraser, 1935).—On a high peak on the ridge north of Depot Creek and east of Chilliwack Lake; about 2 miles north of the International Boundary and  $2\frac{1}{2}$  miles almost due east of the mouth of Depot Creek.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark, cemented in rock, over which is a 5-foot cairn.

**M** (Washington, Whatcom County; D. J. Fraser, 1935).—On the ridge running southeast from Monument 64 and  $1\frac{1}{4}$  miles from the monument. An old trail runs to Monument 64 from Depot Creek, leaving the Depot Creek trail about  $2\frac{1}{2}$  miles from Chilliwack Lake. From Monument 64 follow the ridge southeast to a small clump of scrub hemlocks on the last knoll. The station is just north of these trees. Beyond the station is a rocky canyon and then a steep and high rocky peak.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark, cemented in rock, over which is a small cairn.

**K** (British Columbia, Fraser Valley District; D. J. Fraser, 1935).—On a bare knob on a shoulder running up from a point on the west shore of Chilliwack Lake 2 miles north of the International Boundary. This shoulder runs in a southwesterly direction; follow it to the second bare knob about 3,000 feet above the lake. There is a draw about 50 feet deep just west of the station. The station is directly across the lake from the mouth of Depot Creek.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark, cemented in rock, over which is a 3-foot cairn.

**N** (Washington, Whatcom County; D. J. Fraser, 1935).—Easily recognized from Depot Creek; on top of a perpendicular cliff three-fourths mile south of International Boundary Monument 65. The station can be reached by crossing Depot Creek about one-fourth to one-half mile up from Monument 65, and climbing up a shoulder from the northeast to the flat top of the cliff. There is a sheer drop of about 500 feet from this cliff. The station is about  $2\frac{1}{2}$  meters back from the edge of the cliff.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark, cemented in rock, over which is a small cairn.

**Whitworth** (British Columbia, Yale District; E. C. Barnard, 1905; 1935).—About 5 miles north of the International Boundary, on the third hill from Silver Creek, and on the third ridge from the Skagit River, on a sharp point of rotten rock not quite as high as the most northern one but better located for looking south.

Station mark: An aluminum disk set in a rock 2 feet square, over which is a 5-foot cairn.

**P** (British Columbia, Yale District; D. J. Fraser, 1935).—On the first ridge east of International Boundary Monument 68, on a round-topped rocky knoll about 1 mile north of the boundary.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark, cemented in rock, over which is a 5-foot cairn.

**Q** (British Columbia, Yale District; D. J. Fraser, 1935).—On the highest point of the second ridge west of the Skagit River. The station is about 2 miles north of International Boundary Monument 69. It can be reached by following the boundary trail west from the Skagit River to the summit of the second ridge. The station is about 30 meters from the trail and will be easily found on the highest point.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark, cemented in rock, over which is a 3-foot cairn.

**S** (British Columbia, Yale District; D. J. Fraser, 1935).—On the nearly bare knob, the second knob north of the International Boundary, on a high ridge immediately west of the Skagit River. The station is about 1 mile north along the ridge from Monument 70. The trail crosses the ridge one-quarter mile north of the boundary. From this point the ridge should be followed north to the second knob.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark, set in concrete, over which is a small cairn.

**T** (Washington, Whatcom County; D. J. Fraser, 1935).—On a bare spot a short distance west of the summit of Little Jackass Mountain, where there is an open outlook to the north and west. The station can be reached from the Skagit trail about 2 miles south of the International Boundary.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in cement with a few stones piled around the base of the signal which was erected over the mark.

**Brush** (British Columbia, Yale District; E. C. Barnard, 1904; 1935).—This station has been described under the names "Brush", "Brushy", and "Grassy." It is on the summit of a grass-grown peak with a few evergreen trees scattered about. It is about  $2\frac{1}{2}$  miles north of the International Boundary and  $4\frac{1}{2}$  miles east of the Skagit River. The most western of the Lightning (Quartet) Lakes lies at the foot of the peak  $1\frac{1}{2}$  miles southeast of the station.

Station mark: In 1935 the original station mark was found broken out of the drill hole. A new 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" was set in the original drill hole.

**Rim** (British Columbia, Yale District; Jesse Hill, 1935).—About three-fourths mile north of International Boundary Monument 76; on the bare peak on the north end of the ridge lying west of Pass Creek, the same ridge on which Monument 76 is situated. The station is about 150 meters southwest of the highest point of the mountain.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in rock.

**Poley** (Washington, Whatcom County; Jesse Hill, 1935).—About 0.75 mile south and 0.3 mile east of International Boundary Monument 73; on the north end of the rocky ridge that runs due north from Mount Hozomeen and about one-half mile distant from the peak of the mountain. The ridge is comparatively level at the station and from that point breaks down in a continuous slope to the north.

Station mark: A drill hole in solid rock.

**Lone Mountain** (British Columbia, Yale District; Jesse Hill, 1935).—About 0.7 mile north of the International Boundary, and a little east of Monument 75; on the open-topped mountain, in the forks of the headwaters of Lightning Creek, known as Lone Mountain. The station is on the south slope of the mountain about 30 meters from the top of the ridge and about 100 meters east of the peak of the mountain.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in rock.

**Patrice** (British Columbia, Yale District; Jesse Hill, 1935).—On the isolated mountain, 6,000 feet in elevation, lying in the forks of Similkameen (Cambrie) River and Castle Creek; about  $2\frac{3}{4}$  miles north of the International Boundary and a little east of Monument 79. The station is on the south end of the crest of the mountain at a point where the steep rocky slope south to Castle Creek begins. There is a British Columbia Provincial survey triangulation station on the north end of the crest of the mountain, marked with a small bronze disk bearing the letters "B. C." but not intervisible with station "Patrice." No connection was made with it.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in ledge rock.

**Mack** (British Columbia, Yale District; Jesse Hill, 1935).—About 1.4 meters north of the International Boundary; on the high, sharp, rocky point of the ridge 1.2 miles west of Monument 79 and 0.7 mile east of Monument 78.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in ledge rock.

**Callahan** (British Columbia, Yale District; Jesse Hill, 1935).—About  $1\frac{1}{2}$  miles north of International Boundary Monument 78; on the summit of the ridge on the west side of Castle Creek and running northeast from Frosty Mountain. Stations "Frosty West", "Frosty", and "Patrice" are all on this ridge. The station is situated in an open place on the northeast end of a high knoll.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a rock placed by hand, about 3 feet long and 2 feet wide.

**Otness** (British Columbia, Yale District; Jesse Hill, 1935).—On the southwest slope of the westernmost ridge of the mountain on which International Boundary Monument 83 is situated; about 670 meters nearly due north of Monument 82. The station is on the steep hillside about 45 meters below the comb of the ridge and approximately 90 meters south of the head of the second draw north of the International Boundary.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a rock placed by hand, about 1 foot square.

**Turret** (Washington, Whatcom and Okanogan Counties; E. C. Barnard, 1904; 1935).—About 1 mile south of International Boundary Monument 77; on the crest of the high mountain on the main divide of the Cascade Range known as Turret or Castle Mountain.

Station mark: The station is unmarked. The point observed upon is the highest rocky pinnacle of the mountain as seen from the north.

**Bunker Hill** (Washington, Okanogan County; Jesse Hill, 1935).—About  $1\frac{1}{2}$  miles south and a little west of International Boundary Monument 88; on the summit of the rock dome on the northwesternmost end of Bunker Hill (Gray Mountain). The station is about one-half mile northwest of the U. S. Forest Service Bunker Hill lookout station.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a rock about  $2\frac{1}{2}$  by 4 feet in surface dimensions.

**Nemo** (British Columbia, Yale District; Jesse Hill, 1935).—About  $1\frac{1}{2}$  miles north of the International Boundary and about 3 miles west of the Pasayten River; on the partly timbered knob on the southeast end of the ridge on which station "Roche" is situated. The station is about 12 meters southeast of the summit of the most southeastern knoll of this knob.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a flat-topped rock about 12 inches by 18 inches in dimensions.

**Ella** (British Columbia, Yale District; Jesse Hill, 1935).—About  $1\frac{1}{4}$  miles north of International Boundary Monument 87, about 1 mile east of the Pasayten River, and about 0.7 mile north of Peeve Creek; on a heavily timbered knob about 1,800 feet in elevation above the Pasayten River. The station is located on a small bench about 360 meters down the ridge running a little east of south from the summit of the knob. Lines of sight had to be cut through the heavy timber to all the stations sighted and the location of the station can be identified by the cuttings for many years. The station mark may be found by measuring 6.7 meters north and 1.2 meters west from the largest fir stump of the cuttings. There are many large fir trees to the south and west of the station.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a ledge of rock lightly covered with earth.

**Cathedral** (Washington, Okanogan County; Jesse Hill, 1935).—This station supersedes station "Cathedral" of 1904 which was unmarked except by a cairn and could not be recovered. The station is on the extreme east end of the crest of the bold castellated crag about 8,600 feet in elevation locally known as Cathedral Peak. The peak is 0.8 mile south and a little west of International Boundary Monument 95. The station is about 3 meters west of the edge of the cliff.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in the ledge rock.

**Walls** (British Columbia, Yale District; Jesse Hill, 1935).—About  $1\frac{1}{4}$  miles northeast of International Boundary Monument 96; on the most southern end of a high and rugged rocky mountain having several rock domes on its crest. The station is on the top of a high and prominent cliff somewhat below the top of the south end of the mountain. A pot hole in the rock, about the size of a large tub, and about 3 meters southeast of the station, holds water for some time after rains.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in the ledge rock.

**Bosek** (British Columbia, Yale District; Jesse Hill, 1935).—About three-fourths mile north of the International Boundary, 1.1 miles northeast of Monument 94, and 1.7 miles northwest of Cathedral Peak. The station is on the highest point of a high, bare, rocky peak (elevation about 8,200 feet) that breaks down on the north in a nearly vertical cliff. The station mark is about 3 meters from the edge of the cliff.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a flat-topped rock about  $2\frac{1}{2}$  feet square and rising about 1 foot above the ground.

**Kay** (British Columbia, Yale District; Jesse Hill, 1935).—About 0.9 mile nearly due north of International Boundary Monument 91 and 0.7 mile west of the Ashnola River; on the extreme northeast end of the first prominent ridge north of Monument 91.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in level ledge rock about  $3\frac{1}{2}$  by 5 feet in dimensions.

**Rambo** (Washington, Okanogan County; Jesse Hill, 1935).—About 0.6 mile south and a little east of International Boundary Monument 94 and  $1\frac{1}{2}$  miles west of Cathedral Peak; on the north end of a spur ridge that breaks down in cliffs to the north and east. The station is on the highest point of the ledge, 3 meters from where it breaks down to the east and 25 meters from where it breaks down to the north.

Station mark: A 1-inch drill hole, 3 inches deep, in outcropping ledge rock.

**Crawford** (Washington, Okanogan County; Jesse Hill, 1935).—About 1.2 miles south of the International Boundary, southeast of Monument 100 and southwest of Monument 101; on the highest point of a high bare mountain.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a large rock.

**Giles** (British Columbia, Yale District; Jesse Hill, 1935).—About 0.6 mile north and 0.2 mile west of International Boundary Monument 100; on the summit of a high rocky point directly overlooking the deep canyon of Haig Creek to the west.

Station mark: A 1-inch drill hole in rock.

**Mix** (Washington, Okanogan County; Jesse Hill, 1935).—About one-half mile southwest of International Boundary Monument 99; on the north end of a narrow ridge lying between two deep ravines and pointing toward Monument 99. The station is about midway between the sides of the ridge and about 18 meters back or south of the precipitous end of the ridge.

Station mark: A 1-inch drill hole, 3 inches deep, in an exposure of bed rock about 6 feet square.

**Earle** (British Columbia, Yale District; Jesse Hill, 1935).—On the east end of a spur ridge one-half mile northwest of International Boundary Monument 99. The station is on top and about 3 meters back from the edge of a cliff facing east.

Station mark: A drill hole 1 inch in diameter and 3 inches deep in the rock.

**Manley** (British Columbia, Yale District; Jesse Hill, 1935).—About 0.7 mile north of the International Boundary and 0.9 mile northeast of Monument 104. The station is on the highest part of a bare rocky knoll, on the extreme east end of a high ridge and directly overlooking the extreme west head of Snehumption Creek.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a flat outcropping rock roughly 4 feet by 4 feet in size.

**Jordan** (Washington, Okanogan County; Jesse Hill, 1935).—About 0.7 mile west and 0.25 mile south of International Boundary Monument 105. The station is on the highest part of a bare rocky knoll at the extreme north end of a high spur ridge breaking steeply down to Snehumption Creek to the north.

**Station mark:** A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a flat-topped rock 2 feet by 4 feet in size and rising about 18 inches out of the ground.

**Little Chopaka** (Washington, Okanogan County; U. S. Geological Survey, 1901; 1904).—On a sharp rocky peak of Chopaka Mountain about 8 or 10 miles northwest of Loomis. Station "Chopaka" is on the culminating peak of the ridge, 400 feet higher, and about 2½ miles to the northwest.

**Station mark:** The station was originally marked by a cairn and signal. No other mark is described.

**Palmer** (Washington, Okanogan County; J. G. Hefty, 1930).—About 1½ miles south of the International Boundary and one-half mile east of the Similkameen River. The station is about 1,500 feet above the river, on a partly bare spur of the mountain running north to a low pass. It is about 700 feet lower than the crest of the mountain to the south of the station.

**Station mark:** An International Boundary Commission bronze-disk triangulation mark set in a large rock in place.

**Molson** (Washington, Okanogan County; U. S. Geological Survey; C. H. Sinclair, 1904; 1930).—On the summit of the high bare knob 2 miles northeast of Molson and one-half mile southwest of International Boundary Monument 127.

**Station mark:** A drill hole in solid rock.

**Taylor** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—On a high rocky peak 1.3 miles nearly due north of International Boundary Monument 129.

**Station mark:** An aluminum disk set in a drill hole in rock.

**Gill** (British Columbia, Yale District; J. G. Hefty, 1930).—On the west side of Rock Creek, about one-third mile north and a little west of International Boundary Monument 126. The station is on the side of the hill and on the second rock knob north of Monument 126, and is about 500 feet higher than the monument.

**Station mark:** A bronze disk marked "U. S. & C. B. SURVEY" set in a boulder planted for the purpose.

**Bride** (British Columbia, Yale District; J. G. Hefty, 1930).—On the west side of Rock Creek about 1 mile north and a little east of International Boundary Monument 126; about 2 miles south of Bridesville. The station is on the knoll at the east end of a long gravel ridge that runs out into the valley. There is a deep railroad cut through the point of the ridge about 200 meters east of the station.

**Station mark:** A 2-inch bronze-disk station mark set in a rock 8 by 10 by 15 inches in size, firmly planted in the ground.

**Son** (Washington, Ferry County; J. G. Hefty, 1930).—A few feet south of the International Boundary and on the brow of the hill about three-fourths mile east of Rock Creek. It is on a little flat bench about 30 feet wide that runs level along the side hill for a considerable distance.

**Station mark:** A bronze disk set in a boulder weighing about 175 pounds embedded firmly in the ground.

**Penny** (British Columbia, Yale District; J. G. Hefty, 1930).—On the crest of a little rocky ridge; N. 6° E., 166 meters distant from International Boundary Monument 128.

**Station mark:** A drill hole about 1 inch deep in solid bed rock. A copper penny is battered into the bottom of the drill hole.

**Hurst** (Washington, Okanogan County; J. G. Hefty, 1930).—On the summit of a knob about 200 meters southwest of International Boundary Monument 129.

**Station mark:** A 2-inch bronze disk inscribed "U. S. & C. B. SURVEY" set in rock.

**Myncaster** (British Columbia, Yale District; J. G. Hefty, 1930).—About 1¼ miles north of the International Boundary, on a high, bare ridge on the west side of and overlooking Myers Creek; about three-fourths mile nearly north of the now abandoned Vancouver, Victoria and Eastern Railway station Myncaster. A long narrow lake in Myers Creek Valley, about one-half mile to the northeast, can be seen from the station.

**Station mark:** A 2-inch bronze disk inscribed "U. S. & C. B. SURVEY" set in a drill hole in a very hard stone weighing about 150 pounds, firmly embedded in the ground.

**Rock** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—About 1½ miles north of the International Boundary, on the high rocky hill in the forks of Kettle River and Myers Creek, covered with a thin growth of fir and tamarack. The hill rises abruptly from the east and south, but gradually from the north and west, from either of which sides it may be easily ascended.

**Station mark:** Originally a drill hole in solid rock. In 1930 a bronze disk marked "U. S. & C. B. SURVEY" was set in the drill hole.

**Johnny** (British Columbia, Yale District; J. G. Hefty, 1930).—The station is on the summit of the ridge, in azimuth  $193^{\circ}40'30''$ , 85.74 meters distant from International Boundary Monument 134.

Station mark: A 2-inch bronze disk inscribed "U. S. & C. B. SURVEY" set in a drill hole in a boulder weighing about 150 pounds, firmly set in the ground.

**Frank** (Washington, Ferry County; J. G. Hefty, 1930).—A few feet south of the International Boundary and about half way between Monuments 139 and 140; on the west edge of a spur ridge sloping steeply to the north. The ridge has been logged off, leaving but a few scattered trees standing.

Station mark: A 2-inch bronze disk inscribed "U. S. & C. B. SURVEY" set in outcropping bed rock flush with the general ground level. A small pile of rocks was left over the station mark.

**Irene** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—On a prominent, grassy hill overlooking the town of Midway, about 3 miles northwest of the town. The hill is north of the road, from which it rises gradually.

Station mark: A  $\frac{1}{2}$ -inch drill hole in a rock ledge.

**Danville** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—On the northwest slope of a grassy hill about one-half mile east of the crossing of the International Boundary by the Kettle River near Carson. The hill slopes steeply for a short distance from the station and then gradually to the river bottom.

Station mark: A drill hole in a large rock which is probably the outcrop of a ledge.

**Carson Azimuth Station** (British Columbia, Yale District; Washington, Ferry County; C. H. Sinclair, 1901; 1930).—On the International Boundary, on the edge of a plateau of cultivated land about 150 meters west of Carson, British Columbia, and about 1,200 meters north of Danville, Washington. The station is 3.5 meters west of International Boundary Monument 154.

Station mark: An iron pipe  $3\frac{1}{2}$  inches in diameter firmly set in the ground, with a brass cap attached to the top of it bearing the inscription "South Meridian 1901." A north meridian mark similar to this is set 624 meters to the north.

**Castle** (British Columbia, Yale District; C. H. Sinclair, 1904; 1930).—About  $2\frac{1}{4}$  miles east of the village of Cascade, about  $1\frac{1}{2}$  miles north of International Boundary Monument 168, on the summit of the high, wooded peak east of Kettle River.

Station mark: A 2-inch aluminum disk cemented in a drill hole in a solid rock projecting 6 or 8 inches above the ground and about 14 by 36 inches in lateral dimensions.

**Bowen** (British Columbia, Yale District; Washington, Stevens County; C. H. Sinclair, 1904; 1930).—On the south end of the high, isolated, and partly wooded peak between the north and the south forks of Deep Creek; 6.27 meters west of the center of Monument 169.

Station mark: A cross cut in the rock with a chisel. The rock is very brittle and badly shattered.

**Otto** (British Columbia, Yale District; J. G. Hefty, 1930).—About 2 miles east of Cascade, on the outer edge of a rock rim at an elevation of about 2,950 feet on the south slope of the mountain; directly opposite a sharp south bow of Kettle River from which the river runs nearly straight for about three-fourths mile in a northeasterly direction parallel with the highway.

Station mark: A 2-inch bronze disk inscribed "U. S. & C. B. SURVEY" set in a drill hole in the rock.

**Baldy** (Washington, Stevens County; J. J. McArthur, 1904; 1932).—About 5 miles west of the Clark Fork (Pend-d'Oreille) River and 5 miles south of the International Boundary; on the highest point of Whaleback Mountain, the highest point between the Columbia River and the Clark Fork River.

Station mark: U. S. Geological Survey bronze-disk station mark set in a drill hole in rock.

**Churchill Lookout** (Washington, Stevens County; D. F. Chisholm, 1933).—In the Colville National Forest, 8 miles east of Kettle River and  $2\frac{1}{4}$  miles south of International Boundary Monument 171. This is a lookout tower of the U. S. Forest Service. About 10 miles from Orient on the Orient-Northport road a road goes north to the Big Iron Mine. The station is on the continuation of this road and is 3 miles from the junction of the mine road with the Orient-Northport road. There is no difficulty in taking a car to the station. There is no permanent ground mark.

**Cone** (British Columbia, Yale District; D. F. Chisholm, 1933).—On a mountain  $2\frac{3}{4}$  miles northwest of International Boundary Monument 173, and almost north of mile post 22 on the Cascade-Rossland highway. The station is on the exposed rock 150 feet south of the highest point.

Station mark: A plain bronze-disk triangulation station mark.



**Silver Crown** (Washington, Stevens County; D. F. Chisholm, 1933).—On Silver Crown Mountain 1 mile southeast of the town of Northport. The station is on a rock outcrop about 60 meters north of the highest point. It is most easily reached by proceeding along the road on the north side of the mountain for a distance of 1½ miles from Northport and then climbing the east side of the mountain.

Station mark: A plain bronze-disk triangulation station mark.

**Melvin** (Washington, Stevens County; J. G. Hefty, 1930).—On the west side of a ridge about 1 mile southeast of Monument 181 and about 0.6 mile south of the International Boundary. It is on a skull-shaped granite outcrop which is about 15 feet in diameter. Another outcrop of about the same size, of jagged rock, is about 8 meters to the eastward. The summit of the ridge east of the station is about 400 feet above. The station is located at an elevation of about 2,900 feet.

Station mark: A 2-inch bronze disk inscribed "U. S. & C. B. SURVEY B. M.", on which the "B. M." is partly obliterated, cemented in a drill hole in the rock.

**Waneta** (British Columbia, Kootenay West District; J. G. Hefty, 1930).—On a ridge 1½ miles northwest of the railroad depot at Waneta, British Columbia. It is on a bare rock ledge on the east side of the ridge at an elevation of about 3,100 feet. It is about 180 meters southwest from the highest point of the ridge.

Station mark: A 2-inch bronze disk cemented into a drill hole in the rock.

**Rail** (British Columbia, Kootenay West District; Washington, Stevens County; J. G. Hefty, 1930).—On the rim of the plateau on the east side of the Columbia River, and very near the International Boundary. It is 619.8 meters due east of Monument 181.

Station mark: A piece of railroad rail set on end and projecting about 3 feet above the ground. This mark was set by C. H. Sinclair in 1901 for a mark on the tangent to the 49th parallel as observed from a latitude station near where Monument 181 now stands.

**Crescent** (Washington, Stevens County; D. F. Chisholm, 1934).—On the hill southwest of Crescent Lake.

Station mark: A drill hole in a loose rock.

**South Fork** (Washington, Pend Oreille County; J. J. McArthur, 1904; U. S. Geological Survey; 1934).—About 2½ miles south of the International Boundary; on the summit of Gypsy Mountain, the second high point of the ridge which extends south from Monument 192.

Station mark: Originally a drill hole in rock. In 1934 the station was found marked by a standard U. S. G. S. bronze-disk station mark, but apparently not in the exact location of the original station. The disk was occupied as the station mark.

**Stags Leap** (British Columbia, Kootenay West District; J. J. McArthur, 1904; 1934).—About 1 mile west and 3½ miles north of International Boundary Monument 192; on the highest part of the high and isolated peak known as Lost Mountain.

Station mark: Originally a drill hole in rock. In 1934 the old station mark could not be recovered and a new station was established and marked with a standard International Boundary Commission bronze-disk station mark set in solid rock. The new station is probably about 6 meters southwest of the original station.

**Mawer** (British Columbia, Kootenay West District; D. F. Chisholm, 1934).—One-half mile west and three-fourths mile north of International Boundary Monument 191.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in solid rock.

**Dagon** (British Columbia, Kootenay West District; D. F. Chisholm, 1934).—About one-half mile east and 1 mile north of International Boundary Monument 193.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in solid rock.

**Mundy** (Washington, Stevens County; D. F. Chisholm, 1934).—About one-fourth mile west and 1 mile south of International Boundary Monument 193, on the north end of Gypsy Mountain.

Station mark: A drill hole in solid rock.

**Halma** (Washington, Stevens County; D. F. Chisholm, 1934).—About 1¼ miles east and 1½ miles south of International Boundary Monument 193.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in solid rock.

**Great Butte** (British Columbia, Kootenay West District; D. F. Chisholm, 1934).—About one-half mile west and 2 miles north of International Boundary Monument 194.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in solid rock, over which is a cairn.

**Monk** (British Columbia, Kootenay West District; J. J. McArthur, 1904; 1934).—About one-half mile east and 4 miles north of International Boundary Monument 195, on the west end and on the highest point of a high, square mountain. The station is a little east of north of Big Snowy Mountain.

Station mark: The original station mark was a drill hole in rock. In 1934 the station was occupied by the International Boundary Commission and re-marked by setting a standard International Boundary Commission bronze-disk station mark in solid rock. The new mark is in the approximate position of the old mark.

**Little Snowy** (Idaho, Bonner County; D. F. Chisholm, 1934).—On Little Snowy Mountain about 10 meters north of a U. S. Forest Service lookout cabin. The trail to this station leaves the South Fork of Salmon River 1 mile south of the International Boundary.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in solid rock.

**Continental** (Idaho, Bonner County; J. J. McArthur, 1904; 1934).—On the highest point of Continental Mountain. A United States Forest Service lookout tower is on the mountain.

Station mark: The original mark was a drill hole in rock. In 1934 the station could not be recovered and a new station was established and marked by a standard International Boundary Commission bronze-disk station mark set in a slightly loose rock. The lookout is a few feet west of the station.

**Sack** (British Columbia, Kootenay West District; D. F. Chisholm, 1934).—About 1 mile east and 1¼ miles north of International Boundary Monument 196, on the east end of a long ridge.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in solid rock.

**Center** (Idaho, Boundary County; J. J. McArthur, 1904; 1934).—About 1½ miles south of the International Boundary, on the last northern knob or ridge west of Blue Joe Creek and the road to the Continental Mine.

Station mark: In 1934 the original mark, a drill hole in rock, could not be recovered. A new station was established and marked with a standard International Boundary Commission bronze-disk station mark set in solid rock.

**Parch** (British Columbia, Kootenay West District; D. F. Chisholm, 1934).—About 1 mile east and 2 miles north of International Boundary Mounument 198, on the south end of a flat-topped mountain.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in solid rock.

**Facer** (British Columbia, Kootenay West District; D. F. Chisholm, 1934).—About one-fourth mile east and 1½ miles north of International Boundary Monument 200 and about 30 meters south of the top of the knoll.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in solid rock.

**Duff** (British Columbia, Kootenay West District; D. F. Chisholm, 1934).—About 1½ miles north of International Boundary Monument 201, and several hundred feet southeast from the top of the knoll at the break of the slope overlooking Boundary Creek valley.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in solid rock.

**Nupe** (British Columbia, Kootenay West District; D. F. Chisholm, 1934).—About one-half mile east and 1 mile north of International Boundary Monument 199, at the south end of the south shoulder of the mountain north of the last bridge on Boundary Creek.

Station mark: A standard International Boundary Commission bronze-disk triangulation mark set in solid rock.

**Saddle** (Idaho, Bonner County; J. J. McArthur, 1904; 1934).—On Saddle Mountain about 30 meters south of the highest point. There is an 8-mile trail to the station, starting from the Grass Creek road a short distance from where the road crosses the International Boundary.

Station mark: In 1934 the original station mark could not be recovered and a new station was established and marked with a standard International Boundary Commission bronze-disk station mark set in a flat-topped rock. There is a U. S. Forest Service lookout tower a few feet southwest of the station.

**Wood** (British Columbia, Kootenay West District; J. J. McArthur, 1904; 1934).—About one-half mile east and about 2 miles north of International Boundary Monument 201, on the crest of and near the middle of the hogback ridge extending northeast from station "Duff."

Station mark: The original mark was a drill hole in rock. In 1934 this mark was not positively identified. A standard International Boundary Commission bronze-disk station mark was set in a slight depression in the solid rock.

**Hall** (Idaho, Boundary County; Jesse Hill, 1934).—On Hall Mountain on the first high round dome north of Hall Lookout of the U. S. Forest Service. The dome or rounded knob is timbered on top with spots of prairie on the south side. The station is on the east brink of the top, possibly 30 or 40 feet lower than the highest point and is surrounded by a thick growth of jack pines about 25 feet high. An observing tower 18 feet high was built to see over the tops of trees to the north and east. The tower was eccentric to the station mark. A trail from Hall Lookout to a patrol lookout farther north passes by the station.

Station mark: A 3-inch bronze-disk station mark, bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a large round-topped boulder just north of a flat-topped rock about 3 feet square and 1 foot high. The eccentric distance from the tower to the mark is 12.65 meters. The directions from the tower to the mark are: Station "Mission",  $0^{\circ}00'$ ; mark,  $167^{\circ}33.5'$ .

**Shep** (Idaho, Boundary County; Jesse Hill, 1934).—About  $4\frac{1}{2}$  miles southwest of Porthill, Idaho; on the nose of the high ridge south of Smith Creek, about 2,400 feet above the floor of the valley. The ridge breaks down from the "nose" very precipitously on the north, east, and south, approaching very nearly to a slope of 45 degrees. The station is on the extreme east end of the "nose", a little below the crest which is nearly level for 60 meters to the westward. It commands a clear view to the north, east, and south.

Station mark: A 3-inch bronze-disk station mark, bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in exposed solid granite bedrock.

**Hall Lookout** (Idaho, Boundary County; Jesse Hill, 1934).—The U. S. Forest Service lookout tower on Hall Mountain, the high mountain south of the International Boundary lying between the Kootenai Valley on the west and Mission Creek on the east.

Station mark: The apex of the square roof of the tower. No ground mark was set.

**Mission** (Idaho, Boundary County; C. H. Sinclair, 1905; 1934).—On a rocky elevation one-half mile south of the International Boundary and overlooking Mission Creek to the west. The station is on the west end of the west spur of the mountain that station "Harvey" is on. (See description of "Harvey".)

Station mark: In 1934 the original drill hole in a ledge of rock, marking the station, was recovered. A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" was set in the drill hole.

**Harvey** (Idaho, Boundary County; C. H. Sinclair, 1905; 1934).—On the crest of the ridge between the Moyie Valley on the east and Mission Creek on the west; 0.6 mile south of the International Boundary; on the same ridge and southwest of Monument 212; accessible over U. S. Forest Service roads and trails from Round Prairie.

Station mark: In 1930 the station was recovered as formerly described. It was re-marked by setting a bronze-disk station mark, bearing the words "INTERNATIONAL BOUNDARY COMMISSION", in the original drill hole in rock.

**Border** (British Columbia, Kootenay East District; U. S. Geological Survey, 1900; C. H. Sinclair, 1904; 1934).—On the summit of Border Mountain, the first mountain on the International Boundary, west of the Moyie River. The station is on the western rock rim of the highest part of the mountain and is 95 meters northwest of International Boundary Monument 214. The station is easily reached by a 2-hour climb from Kingsgate, British Columbia, or Eastport, Idaho.

Station mark: The station was recovered, in 1934, and found marked by a copper bolt stamped "U. S. G. S." set vertically in a deep crevice in the outcropping rock and packed in place with fine broken stone. The bolt was removed and replaced by a 3-inch bronze disk bearing the words "INTERNATIONAL BOUNDARY COMMISSION." There being no solid rock at the station that could be drilled, the crevice was cleaned and chipped out to firm rock and filled with cement grout in which the disk was set approximately 1 foot below the surface of the rock outcrop.

**Harper** (British Columbia, Kootenay East District; Jesse Hill, 1934).—This station supersedes a former station "Harper" of 1904 which could not be recovered. It is located on the southwest slope, near the top of a hill,  $1\frac{1}{2}$  miles north and one-third mile east of Kingsgate, British Columbia, and in sight against the skyline from Kingsgate. There are a number of bare spots interspersed with timber on the hill. The station is useful only for points within its southern hemisphere. A hub with a nail in it and bits of a broken signal were found where the original description called for "a drill hole in flat rock and small cairn above it."

Station mark: A 3-inch bronze-disk station mark, bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a large boulder firmly embedded in the ground.

**Perry** (British Columbia, Kootenay East District; Jesse Hill, 1934).—On the east slope of the mountain west and across the valley from Border Mountain; one-half mile west and 1.1 miles north of International Boundary Monument 213. The station is on an open spot on the prominent spur ridge that comes down between the waters running north into Little Moyie River and the waters running south into Round Prairie Creek. The station is about 1,100 feet above the floor of the marshy valley.

Station mark: A cross cut in the surface of a large boulder in place.

**Speer** (British Columbia, Kootenay East District; Jesse Hill, 1934).—About  $1\frac{1}{2}$  miles north of International Boundary Monument 227;  $1\frac{1}{2}$  miles west and 1 mile north of the elbow or big bend of West Fork of Yaak River. The station is on the south nose of the north-and-south ridge on which station "Lodge" is located. The slopes to the south and east of the station have been logged off and burned over. There is green timber on the west slope. Clearing had to be done for all lines of sight.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a large, firmly embedded boulder.

**Fork** (British Columbia, Kootenay East District; Jesse Hill, 1934).—On the high partly open end of the mountain spur between the main forks of the North Fork of Yaak River; 2 miles north of International Boundary Monument 231.

Station mark: A 3-inch bronze-disk station mark, bearing the words "INTERNATIONAL BOUNDARY COMMISSION", cemented into a drill hole in solid rock.

**Lick** (Montana, Lincoln County; Jesse Hill, 1934).—One mile west of the North Fork of Yaak River and  $1\frac{1}{2}$  miles south of the International Boundary; on a sharp rocky spur on the north end of a north-and-south ridge paralleling the river. The station is about 300 feet below and some distance north of the highest point of the ridge. This is not the original station "Lick" of 1904, though probably near it; the original station could not be recovered as described. However, the remains of an old signal were found a few feet from the present station.

Station mark: A bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a large flat rock outcrop.

**Gold** (British Columbia, Kootenay East District; Jesse Hill, 1934).—On the summit of Canadian Caribou Mountain; on the same ridge as station "Caribou" and Boundary Monument 236, and  $1\frac{1}{4}$  miles north of the monument. The mountain is nearly bare of trees and is easily recognized by its prominence.

Station mark: A 3-inch bronze-disk station mark, bearing the words "INTERNATIONAL BOUNDARY COMMISSION", cemented into a drill hole in a rock 18 by 18 by 16 inches in size, set with its top surface flush with the ground.

**Wood Lookout** (Montana, Lincoln County; Jesse Hill, 1934).—The U. S. Forest Service lookout tower on Wood Mountain; about 2 miles east of the North Fork of Yaak River and about 2 miles south of the International Boundary; on the high south end of the mountain.

Station mark: The apex of the square roof of the tower. No ground mark was set.

**Sam** (Montana, Lincoln County; Jesse Hill, 1934).—This is not station "Sam" of 1904 which was destroyed. A small rock, about 6 inches in diameter with a shallow depression cut in the top of it, was found in 1934, but in so unstable a condition that it was not accepted, and a new station was established near it. The new station is approximately on the International Boundary on the east edge of a bench about one-third mile west of Monument 241. The ground slopes steeply from the station to the east, and is covered with a thick growth of timber. The station sees to the eastward only.

Station mark: A 3-inch bronze-disk station mark bearing the words "INTERNATIONAL BOUNDARY COMMISSION" set in a drill hole in a large boulder firmly implanted in the ground.

**Gateway Azimuth Station** (British Columbia, Kootenay East District; Montana, Lincoln County; C. H. Sinclair, 1901; 1934).—On the International Boundary on the bench just east of Gateway, Montana; 180.6 meters west of Boundary Monument 245.

Station mark: A 4-inch iron pipe with a brass cap, projecting about 16 inches above the ground. A like pipe for the north mark on the meridian was set in the edge of the woods 681 meters to the north.

**Scott** (British Columbia, Kootenay East District; C. H. Sinclair, 1904; 1932).—About 5 miles east of Gateway, Montana; 1,000 meters north of the International Boundary and about 600 meters west of Phillipps Creek; on a bare, flat-topped hill with many loose stones scattered over it.

Station mark: A drill hole in a rock about level with the surface of the ground.

**Kiln** (Montana, Lincoln County; W. M. Dennis, 1932).—About  $5\frac{1}{2}$  miles east of Gateway and about one-fourth mile south of the International Boundary; on the summit of a sharp point of limestone on the foothills west of Phillipps Creek; about 500 feet above the floor of the valley and just above an old lime kiln.

Station mark: A drill hole in the rock.

**Monument 247 ecc.** (British Columbia, Kootenay East District; Montana, Lincoln County; W. M. Dennis, 1932).—About 5 miles east of Gateway, Montana, and on the true line of the boundary, 71.835 meters west of Monument 247.

Station mark: A drill hole with a copper penny in it, in a limestone boulder 10 inches in diameter set with its top surface 12 inches below the surface of the ground. The surface mark is a drill hole in a limestone boulder 18 inches in diameter by 12 inches in depth set flush with the ground.

**Muchuck** (British Columbia, Kootenay East District; Jesse Hill, 1933).—About 1 mile northwest of International Boundary Monument 257; on the heavily wooded ridge between the two main creeks flowing into the north side of Frozen Lake. The ridge has several bare rock exposures. The station is on one of these about 500 feet below the summit.

Station mark: A copper nail set in cement in a drill hole surrounded by a triangle cut in a large rock in place.

**Bud** (Montana, Flathead County; Jesse Hill, 1933).—In the extreme northwest corner of Flathead County, 51.38 meters from International Boundary Monument 256, in azimuth 317°33'.

Station mark: An eightpenny nail in a hub 4 inches in diameter over which is a 4-foot cairn.

**Point Edward** (British Columbia, Kootenay East District; Jesse Hill, 1933).—On the southwest shoulder of King Edward Mountain, in the forks of Starvation Creek.

Station mark: A twentypenny nail driven in the shale rock. The southwest corner of a large diamond-shaped rock is 4.3 meters from the station in azimuth 219°. The northeast corner of the same rock is 7.9 meters from the station in azimuth 245°.

**Akamina** (British Columbia, Kootenay East District; Jesse Hill, 1933).—On a red rock point N. 12° W., 1.6 miles from International Boundary Monument 271, and just east of a low gap between the Akamina and North Kintla Creek watersheds.

Station mark: A copper penny driven in a hole in the shale rock with a 5-foot cairn over it.

**Goat** (British Columbia, Kootenay East District; Montana, Flathead County; Jesse Hill, 1933).—On the International Boundary, on the east side of Kintla Creek and about 23 meters west of the rock wall of the south spur of Red Mountain.

Station mark: A cross cut in flat rock.

**Red Mountain** (British Columbia, Kootenay East District; C. H. Sinclair 1905; 1933).—On the high peak on the Akamina Ridge locally known as Red Mountain; about one-half mile north of the International Boundary and about one-half mile due south of Wall Lake.

Station mark: A high red cairn. No center mark is recorded.

#### SUMMIT OF ROCKY MOUNTAINS TO LAKE OF THE WOODS, MINOR SCHEMES

**Campbell No. 1** (Montana, Glacier County; C. H. Sinclair, 1909).—About 1¼ miles south of the International Boundary and 1½ miles west of Waterton Lake; on the summit of the high knob on the northeast spur of Mount Campbell and about one-half mile distant from the highest peak of the mountain.

Station mark: A cairn. No center mark is recorded.

**Cleveland** (Montana, Glacier County; U. S. Geological Survey, 1901; 1909).—On the summit of Mount Cleveland in Glacier National Park. This mountain, one of the highest in the Park, is on the dividing ridge between the waters of Little Kootenai Creek on the north and Belly River on the east. It has a cliff about 4,000 feet high on the north and east.

Station mark: An aluminum disk cemented in a flat rock buried in the ground under the center of a cairn 8 feet high.

**Belly East** (Montana, Glacier County; C. H. Sinclair, 1909).—About 3 miles south of the International Boundary and about 3 miles west of Belly River; on the ridge north of the east end of Glens Lakes. The station is on the eastern summit of the ridge. Station "Belly" is on the western summit of the same ridge about 600 meters distant.

Station mark: Probably a drill hole in the rock with a cairn over it.

**Chief North** (Montana, Glacier County; C. H. Sinclair, 1909).—About 3.6 miles south of the International Boundary, on the eastern of the two ridges running northward from Chief Mountain. The station is on a knoll, practically bare, about 200 meters up the slope, southwest of a wooded hill.

Station mark: A drill hole in a stone set in place.

**Rankin** (Montana, Glacier County; J. G. Hefty, 1921).—On the north slope of the first hill south of the International Boundary at Monument 293 and approximately S. 13° W., 770 meters from the monument.

Station mark: A bronze disk set in a rock about 1 by 2 feet in size, placed flush with the surface of the ground.

**Arnold** (Alberta, Lethbridge District; J. G. Hefty, 1921).—On a flat-topped hill running east and west about one-half mile south of the St. Marys River; about 1.6 miles N. 20° E. from International Boundary Monument 293. The station is about 18 meters west of the west side of a north-and-south road allowance.

Station mark: A bronze disk set in outcropping ledge rock.

**Quartz** (Alberta, Lethbridge District; C. H. Sinclair, 1910).—About 45 meters southwest of the highest part of a knoll 700 meters northwest of International Boundary Monument 325.

Station mark: A drill hole within a triangle cut in a quartz ledge showing an exposure of about 15 by 24 inches nearly flush with the ground. A cairn was erected over the mark.

**Miller** (Montana, Toole County; J. G. Hefty, 1921).—On a rocky hump on high rolling ground about  $1\frac{1}{4}$  miles southwest of International Boundary Monument 328; about 90 meters north of the southwest corner of sec. 5, T. 37 N., R. 4 W., principal meridian.

Station mark: A drill hole within a triangle cut in the top of a very large and solid granite boulder.

**Enright** (Saskatchewan, Maple Creek District; J. J. McArthur, 1909).—About  $2\frac{1}{4}$  miles north of International Boundary Monument 427; in NE $\frac{1}{4}$  sec. 15, T. 1, R. 23 W., third meridian. The station is on the highest part of the Cherry Ridge escarpment.

Station mark: A bronze disk set in a boulder.

**Fire** (Montana, Valley County; C. H. Sinclair, 1910).—About 1.4 miles southeast of International Boundary Monument 506; on one of the buttes on the northwest edge of the plateau on the west side of the West Branch of Poplar River.

Station mark: A drill hole within a triangle cut in a granite boulder.

**Bully** (Saskatchewan, Wood Mountain District; C. H. Sinclair, 1911).—About 200 meters north of the International Boundary, 0.9 mile west of Monument 546; in SW $\frac{1}{4}$  sec. 6, T. 1, R. 24 W., second meridian. The station is on the northwest point of a flat tableland overlooking the valley of the West Fork of Beaver Creek.

Station mark: A bronze disk in the top of a concrete block set about 2 feet in the ground.

**Bob** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About 0.7 mile north-northwest of International Boundary Monument 561; in W $\frac{1}{2}$  sec. 1, T. 1, R. 21 W., second meridian. The station is on the southeast slope near the top of a hill just north of a narrow coulee running east and west.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete block 6 by 6 by 16 inches in size.

**Dahl** (Saskatchewan, Weyburn District; C. H. Sinclair, 1911).—About three-fourths mile N. 25° E. of International Boundary Monument 577; in NE $\frac{1}{4}$  sec. 4, T. 1, R. 17 W., second meridian. The station is on a tableland, a short distance from its east edge.

Station mark: A bronze disk set in a concrete block with a small cairn built over it.

**Ulan** (Montana, Sheridan County; C. H. Sinclair, 1911).—On the east edge of a plateau overlooking the valley to the east; about three-fourths mile southwest of International Boundary Monument 578; in NE $\frac{1}{4}$  sec. 4, T. 37 N., R. 57 E., principal meridian.

Station mark: A bronze disk marked "U. S. & C. B. SURVEY" set in a concrete block with a small cairn over it.

**Center XVIII** (North Dakota, Bottineau County; 1918).—About one-half mile southeast of International Boundary Monument 708 and about one-half mile east of Hartley Lake. The station is on the apex of a sharp and prominent knoll.

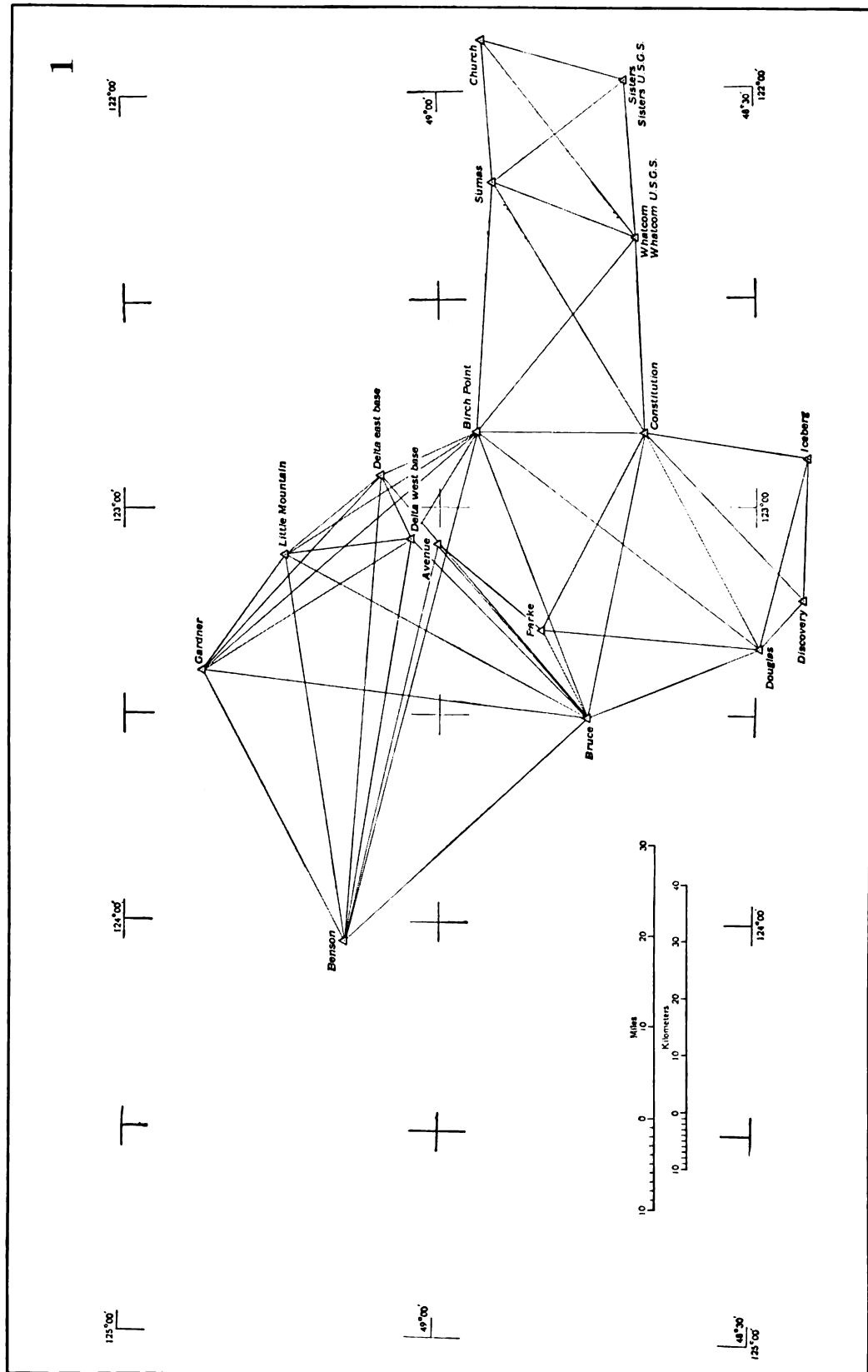
Station mark: The surface mark is a bronze disk set in a granite boulder 10 by 12 by 20 inches, whose top is flush with the ground. The subsurface mark is a cross cut with a chisel in the surface of a flat black stone 6 by 14 by 20 inches, set 2 feet below the surface of the ground.

**Emerson Railroad Tower** (Manitoba, Provencher District; 1912).—The railroad signal-tower at the crossing of the Canadian National and the Canadian Pacific Railroads in the city of Emerson.

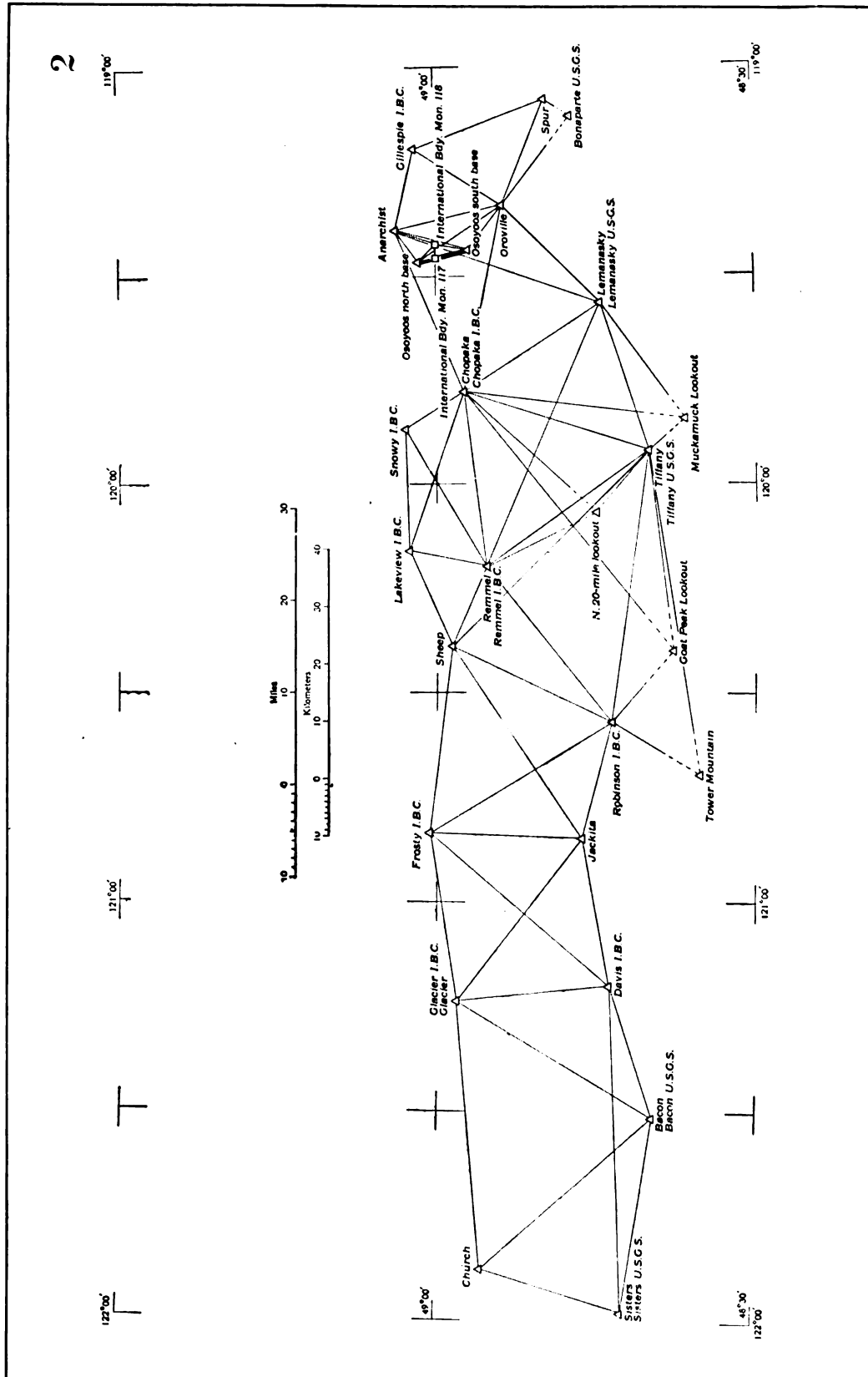
Station mark: The center of the tower.

**Emerson Astronomic Station** (Manitoba, Provencher District; 1912; 1928).—In the city of Emerson, 125.36 meters north of the International Boundary; 346 meters south and 13.3 meters east of the southeast corner of Morris and Second Streets.

Station mark: A concrete instrument stand or pier. Probably a copper bolt for center mark.

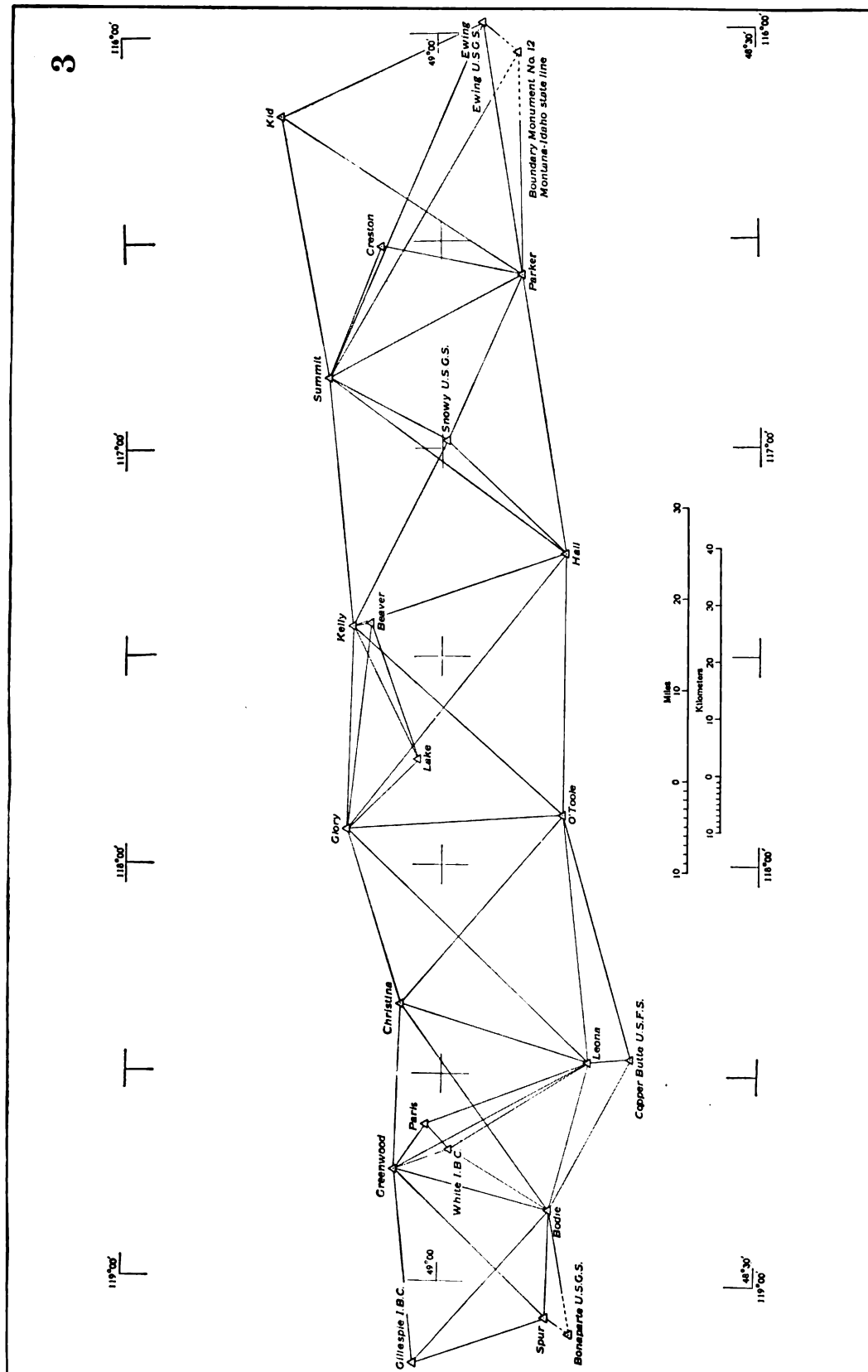


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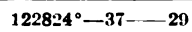


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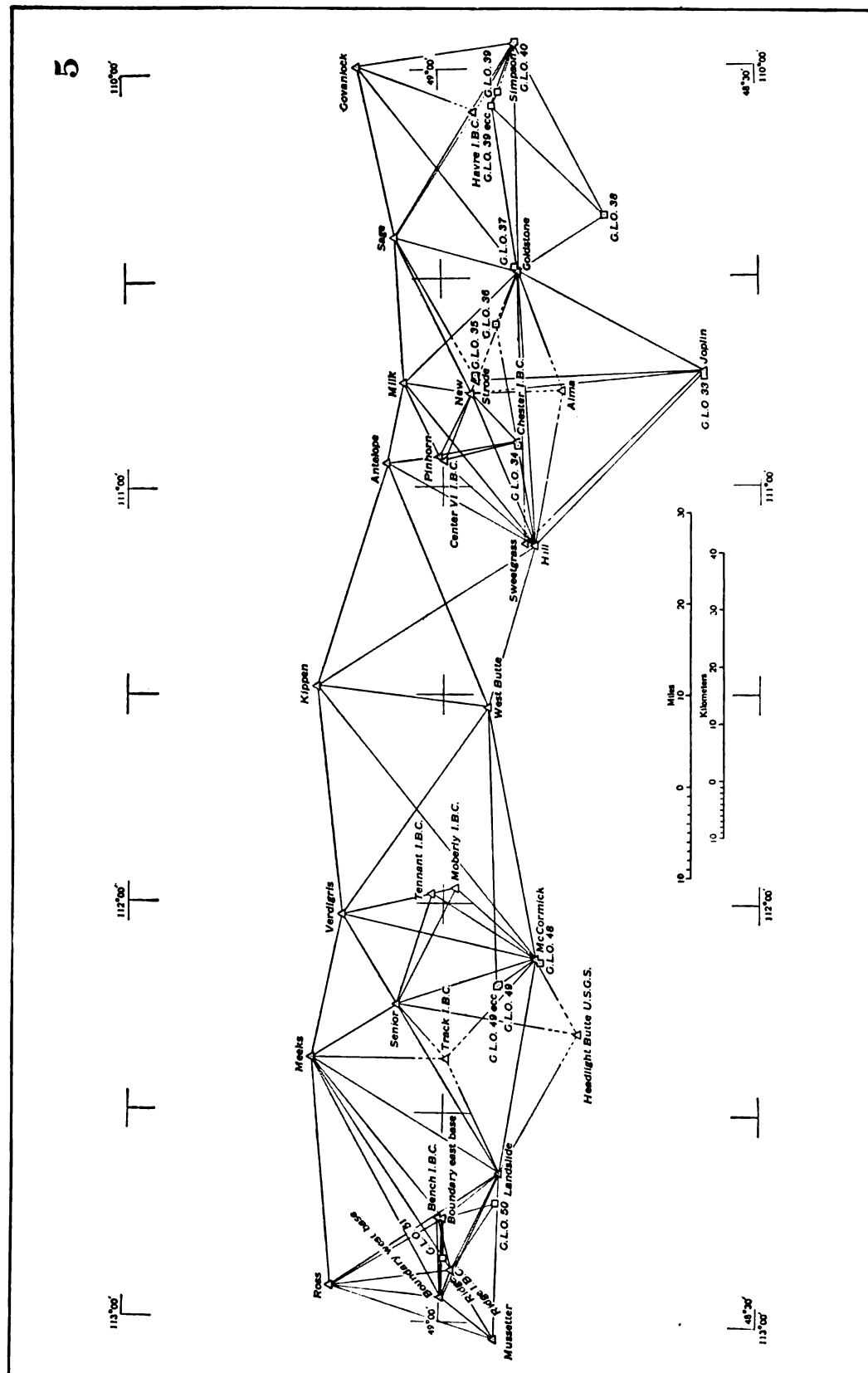




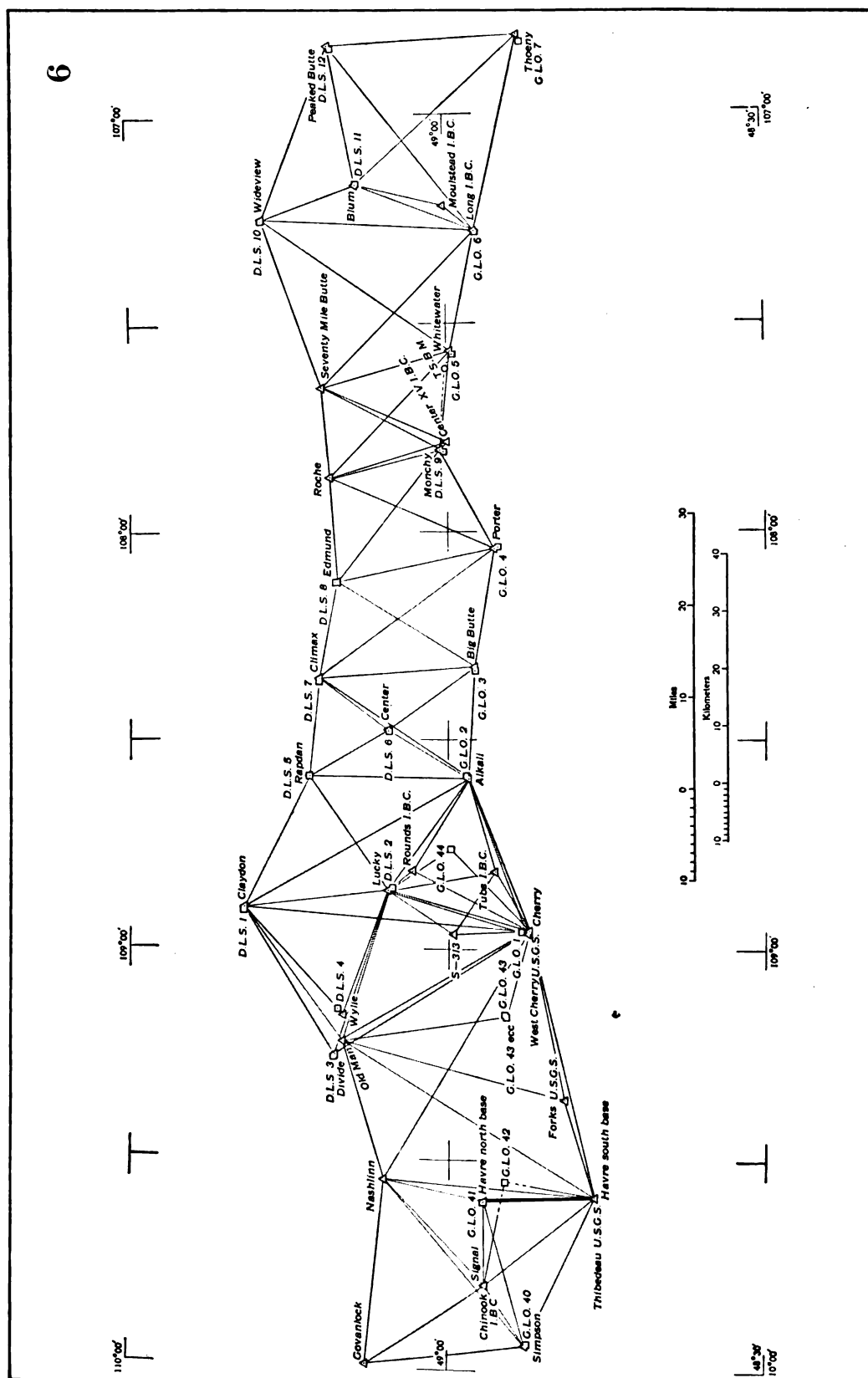
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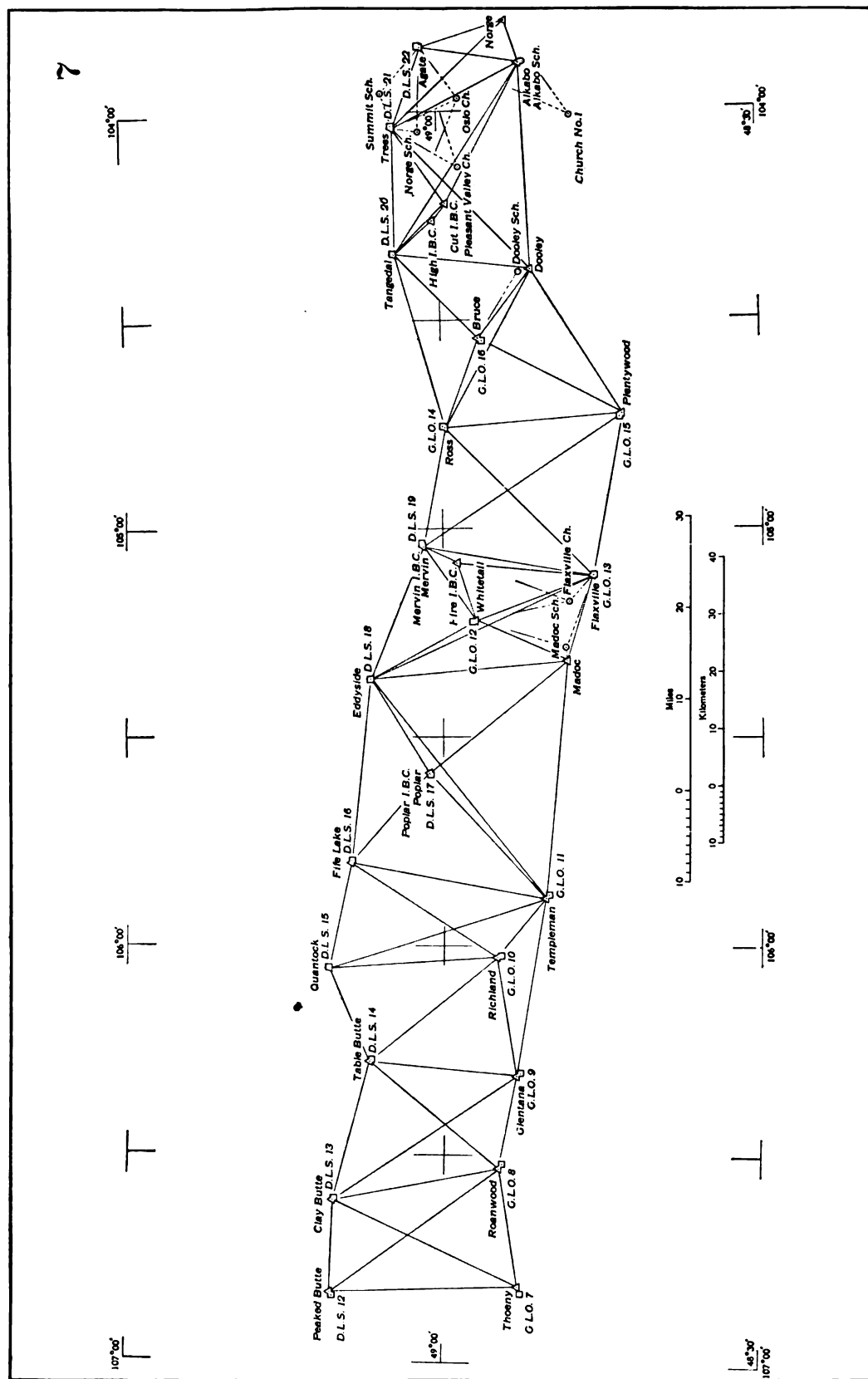
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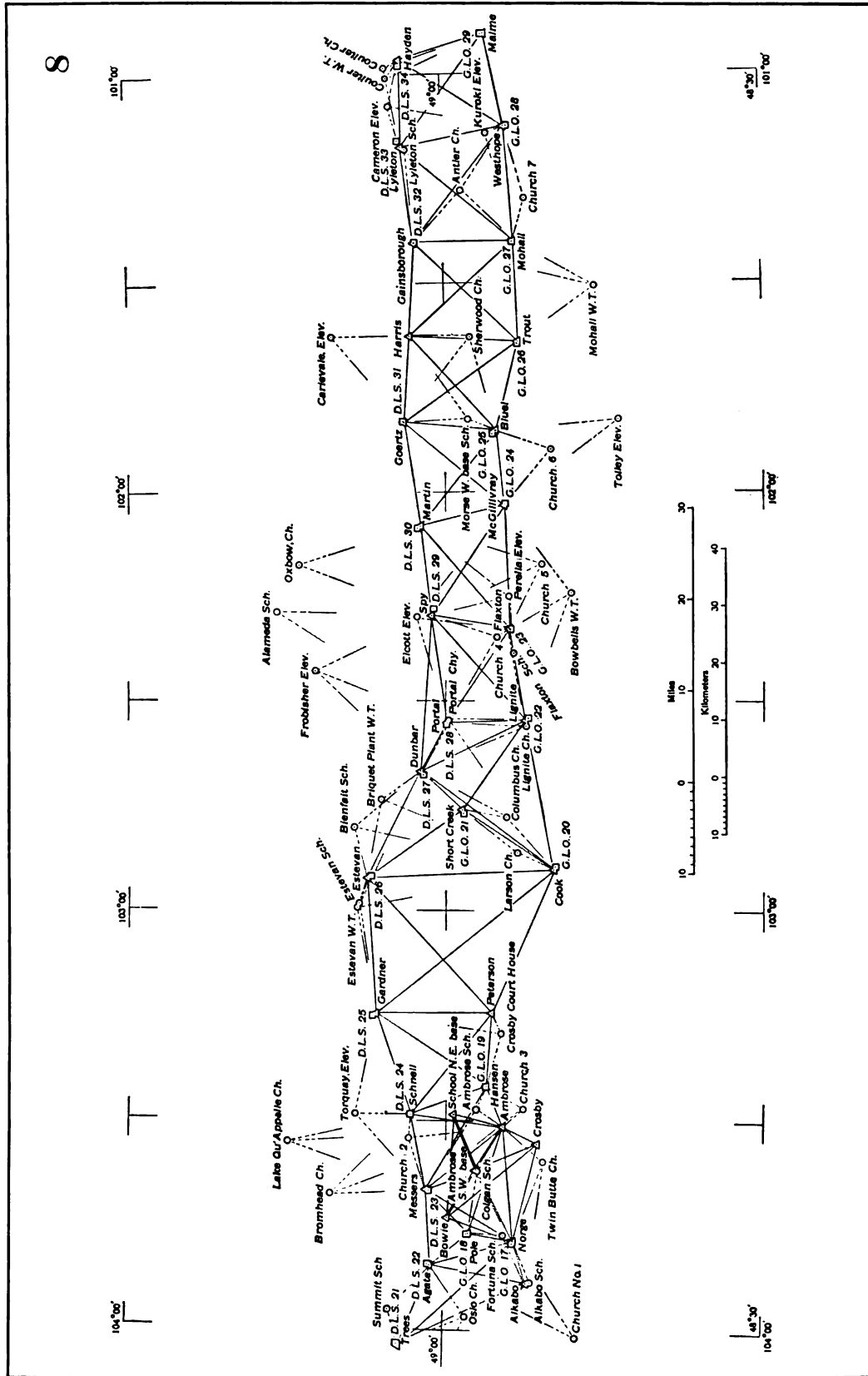
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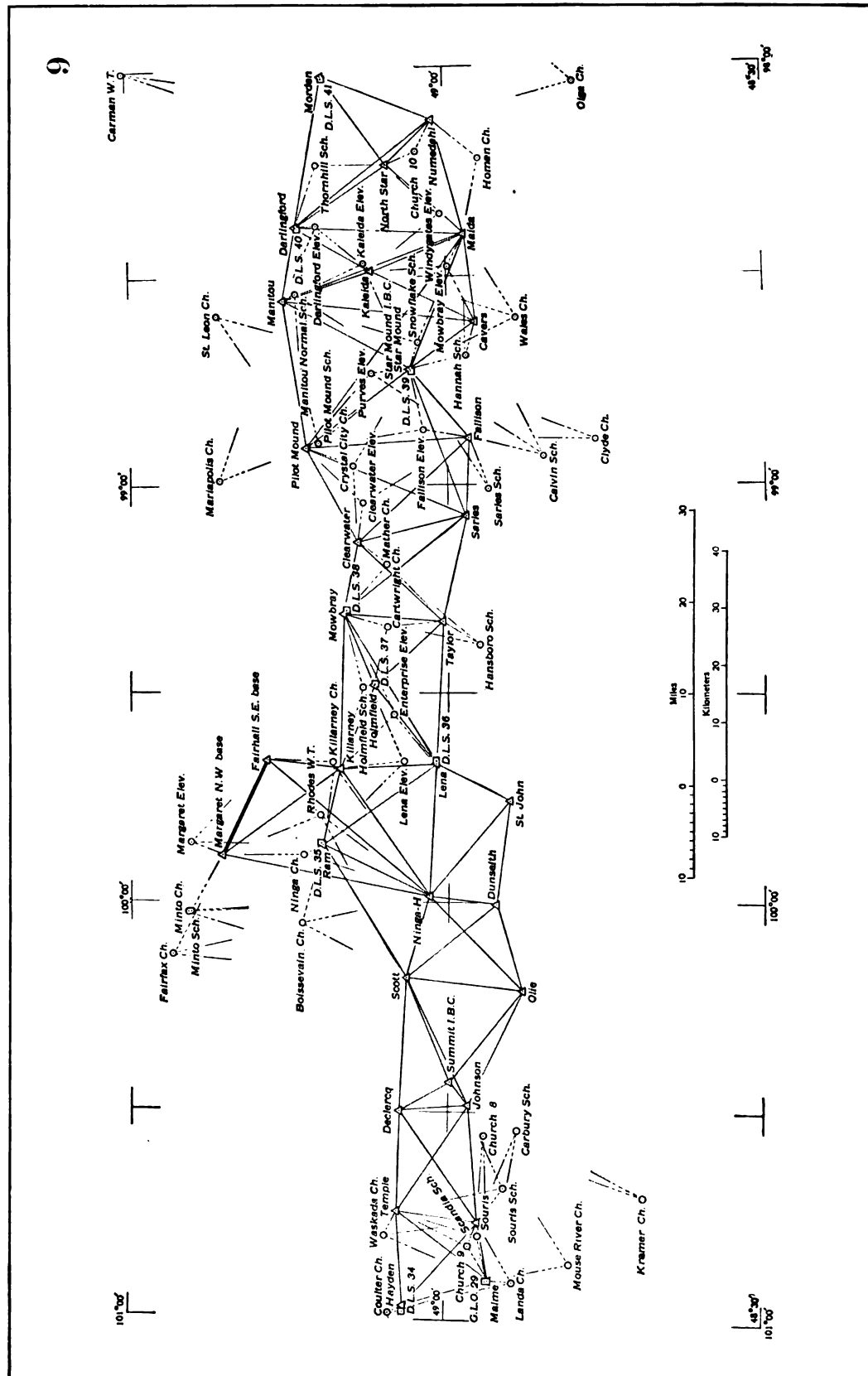
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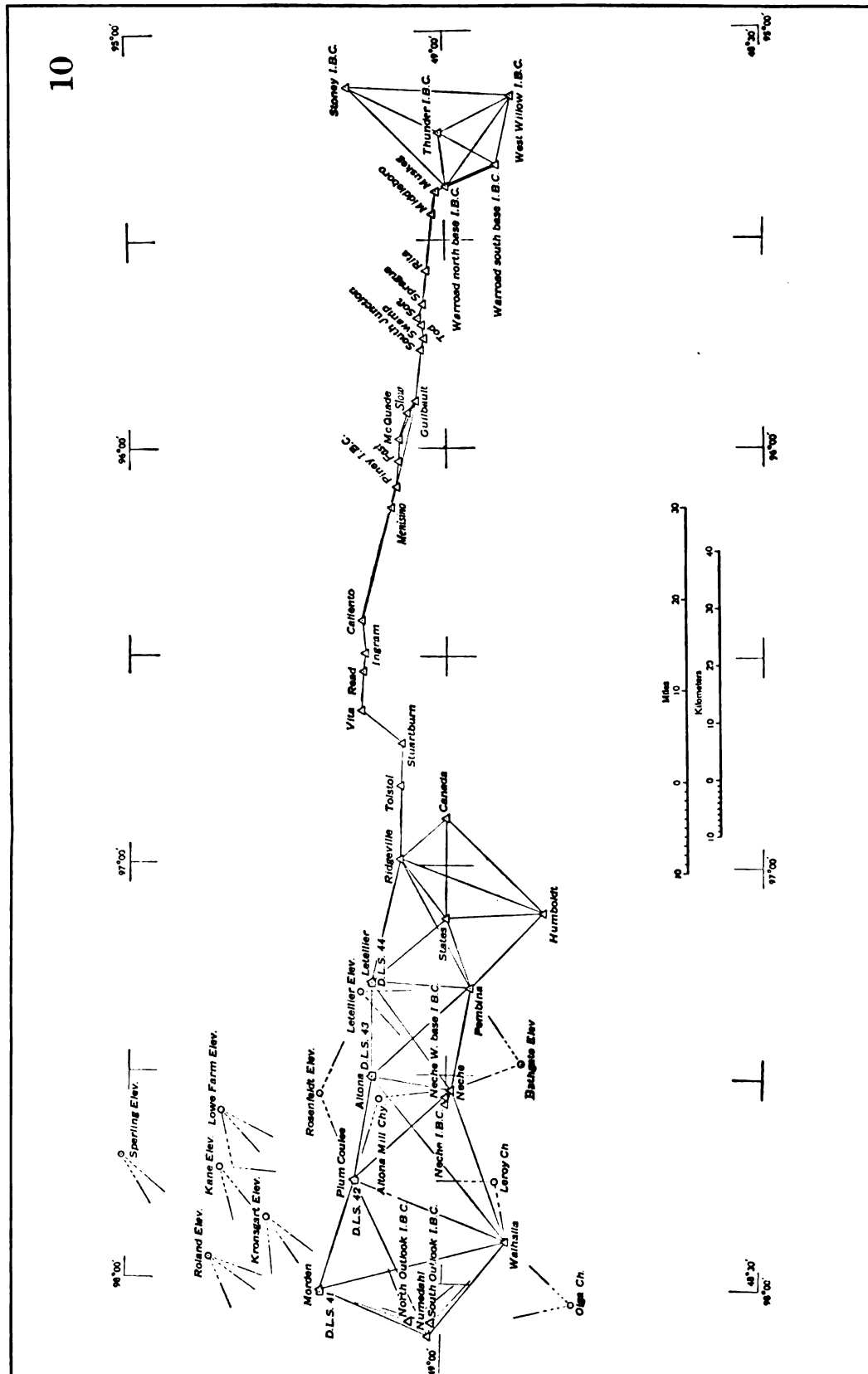
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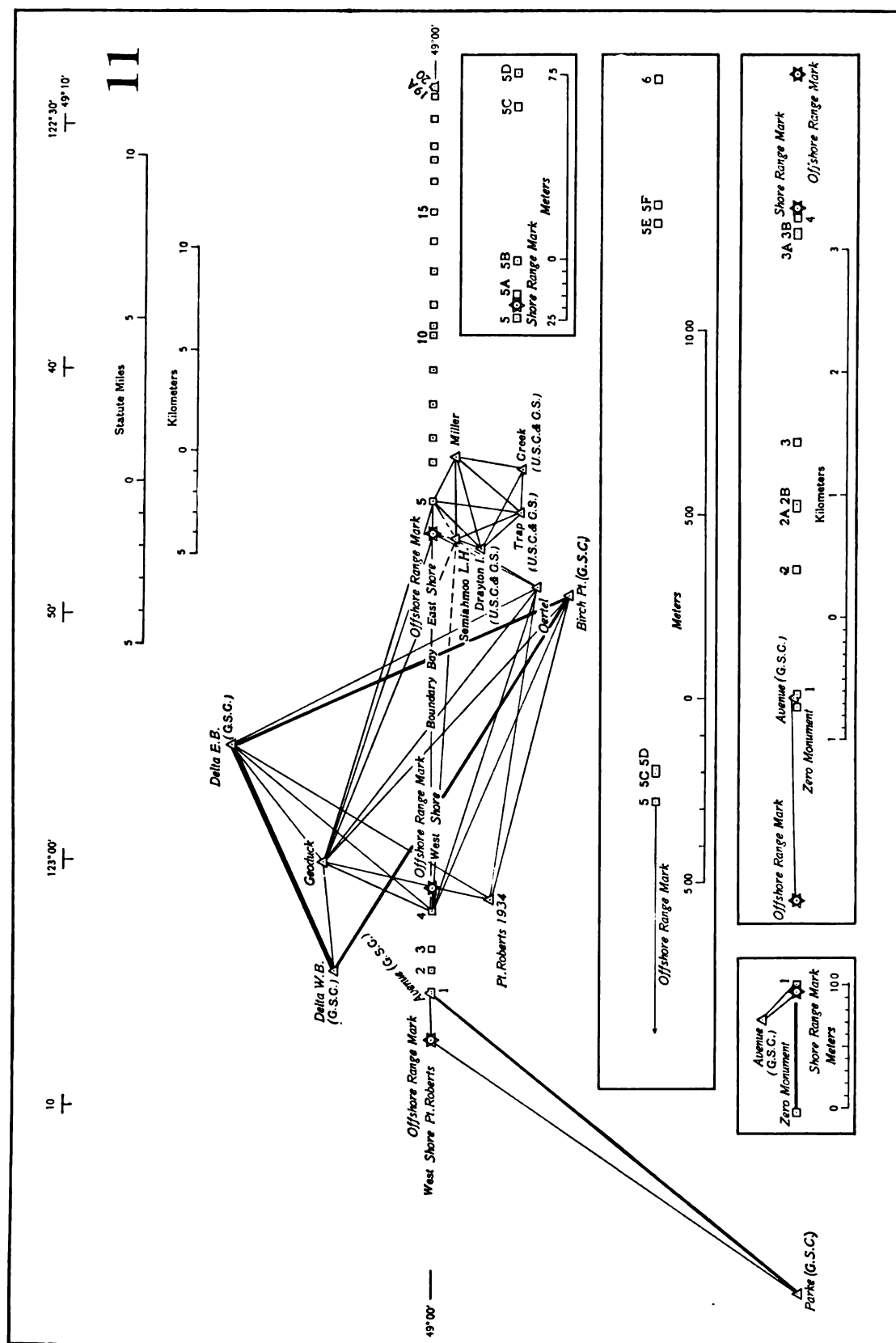


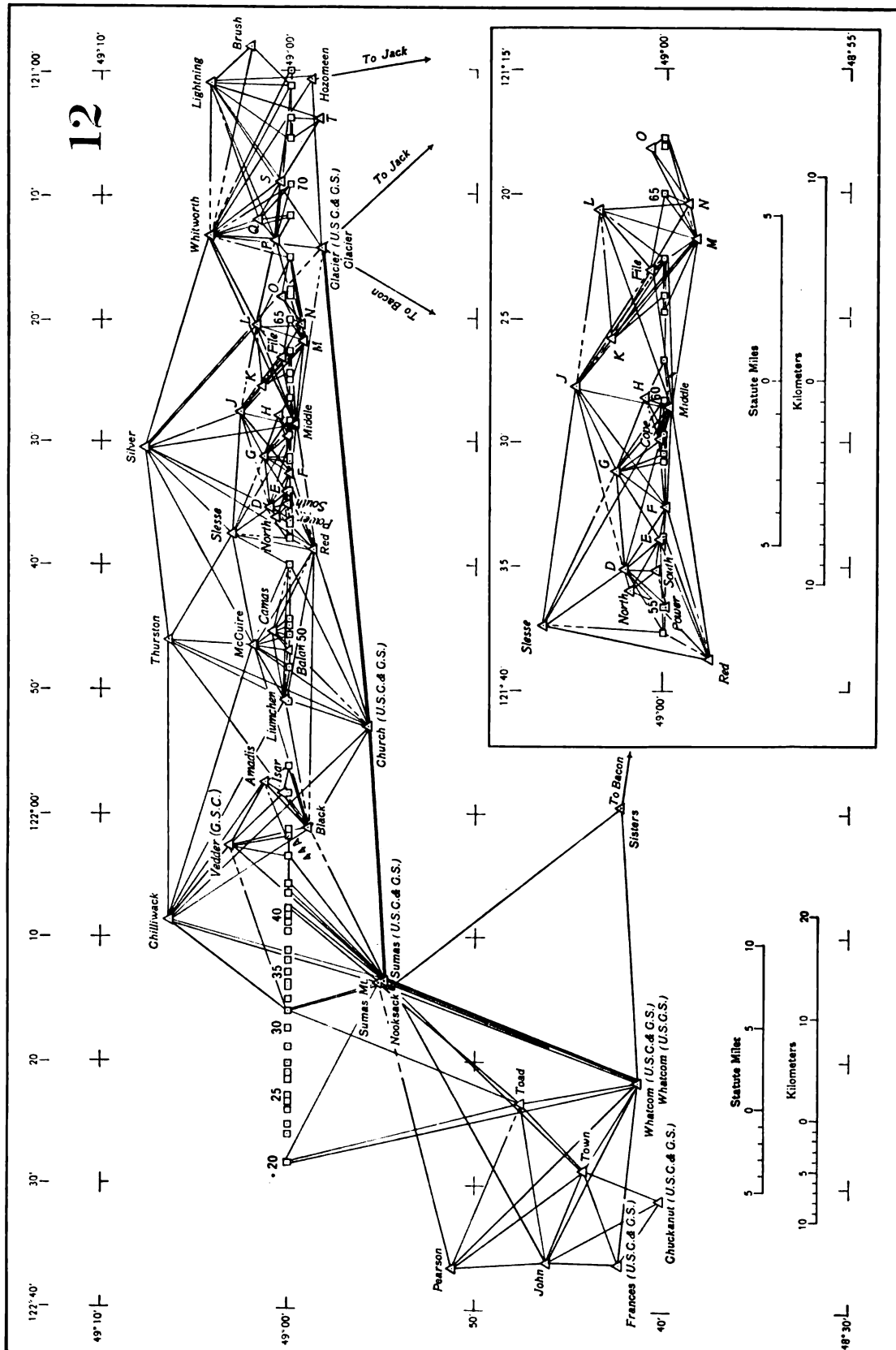
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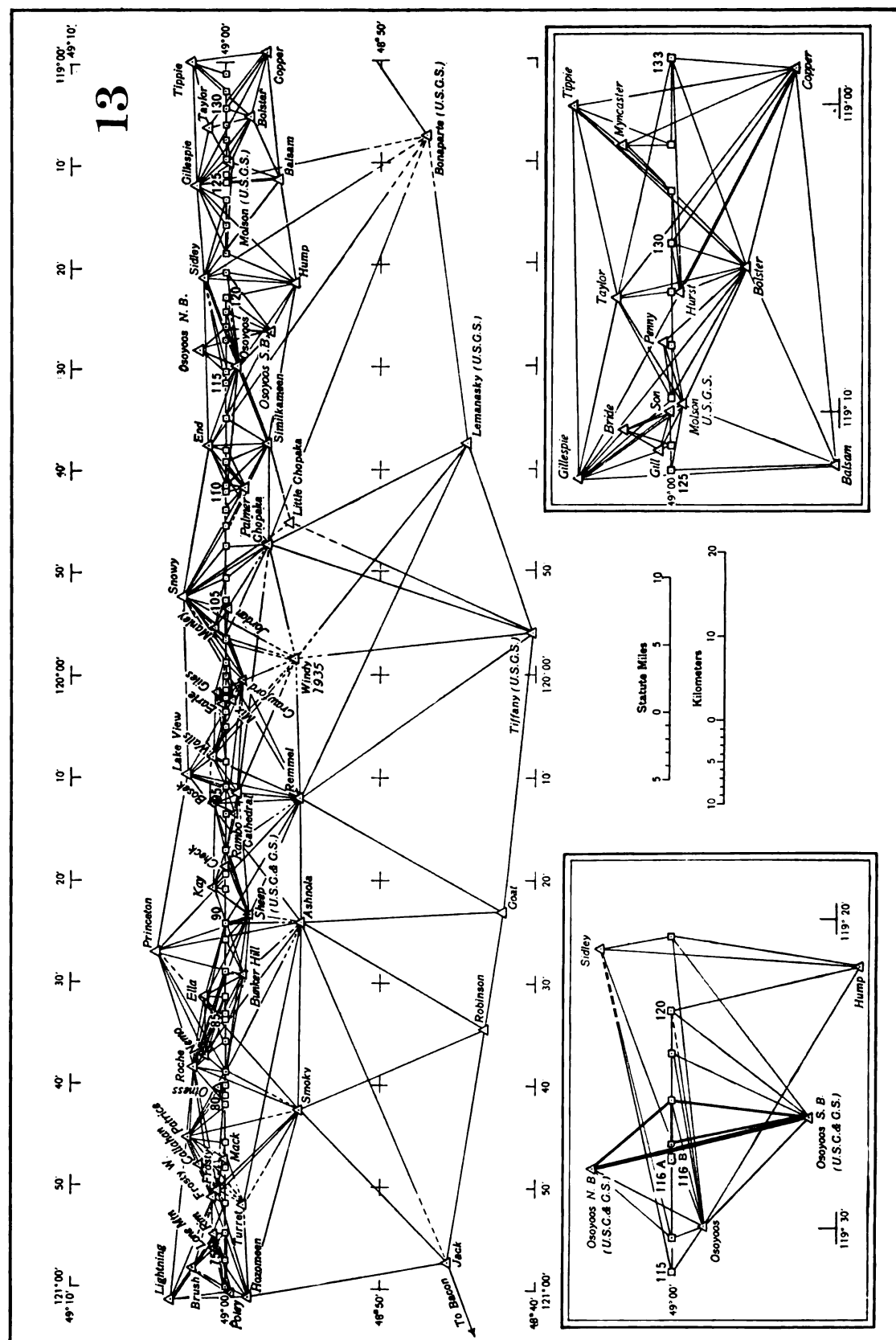
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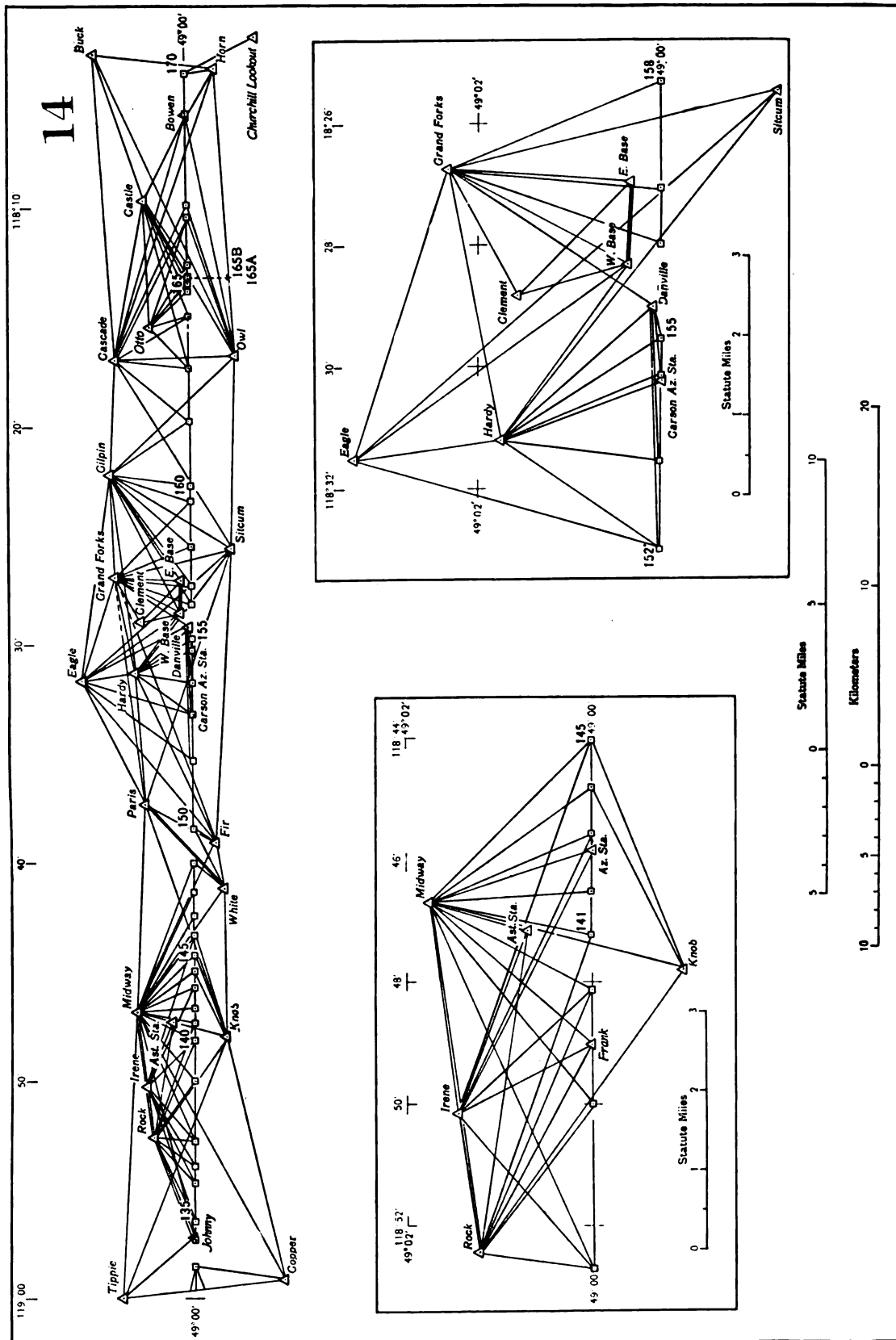


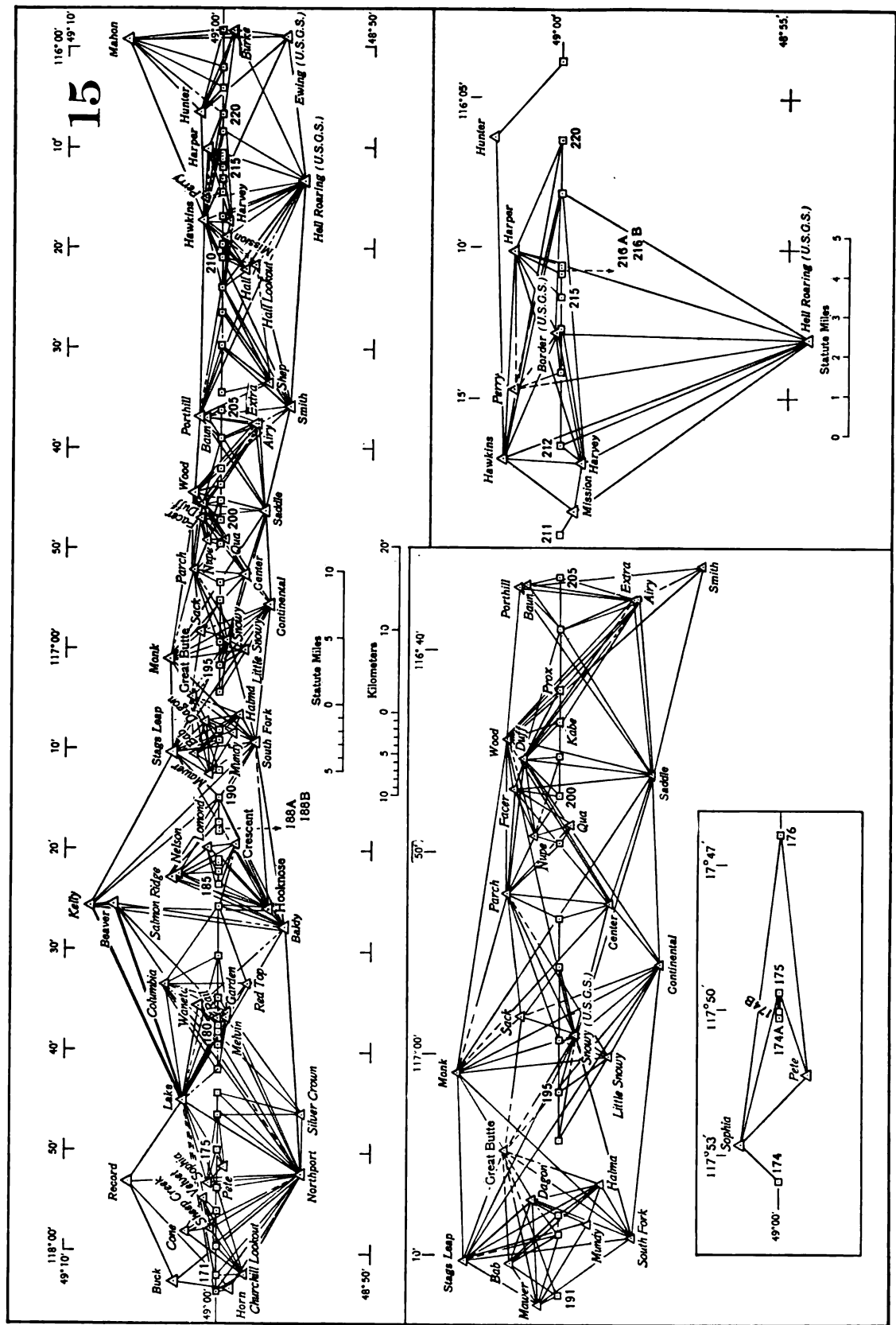




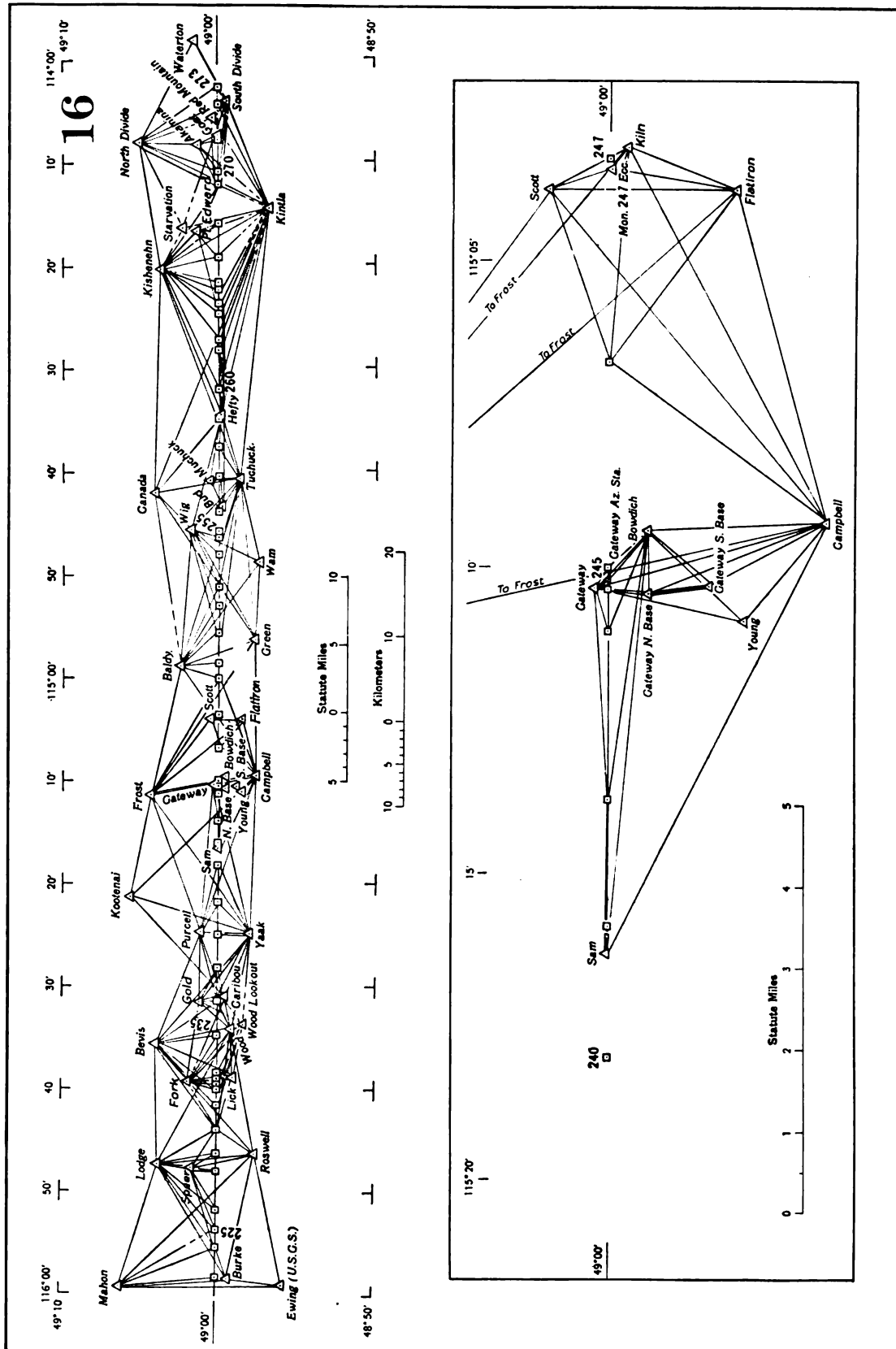
TRIANGULATION, MAJOR AND MINOR SCHEMES



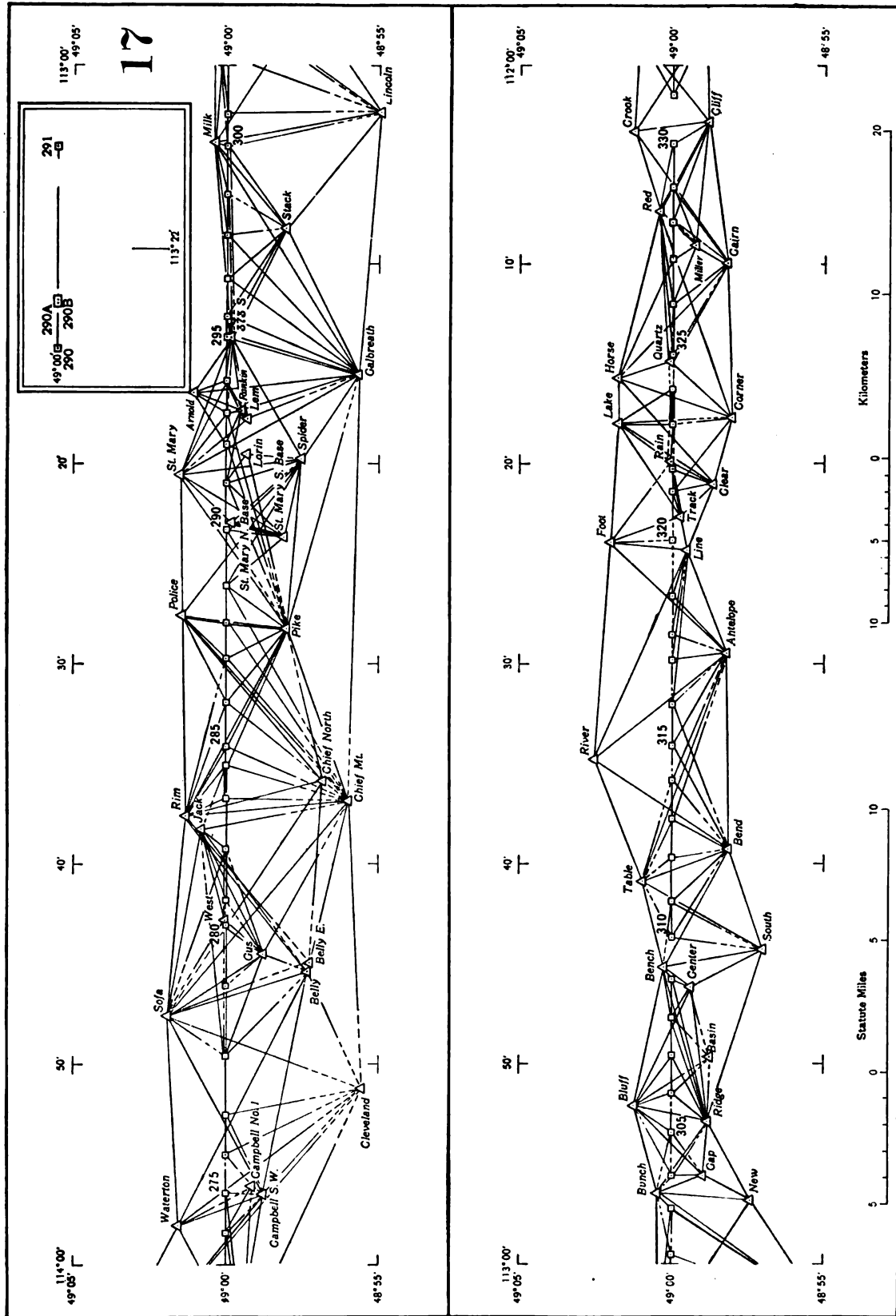




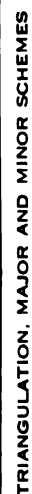
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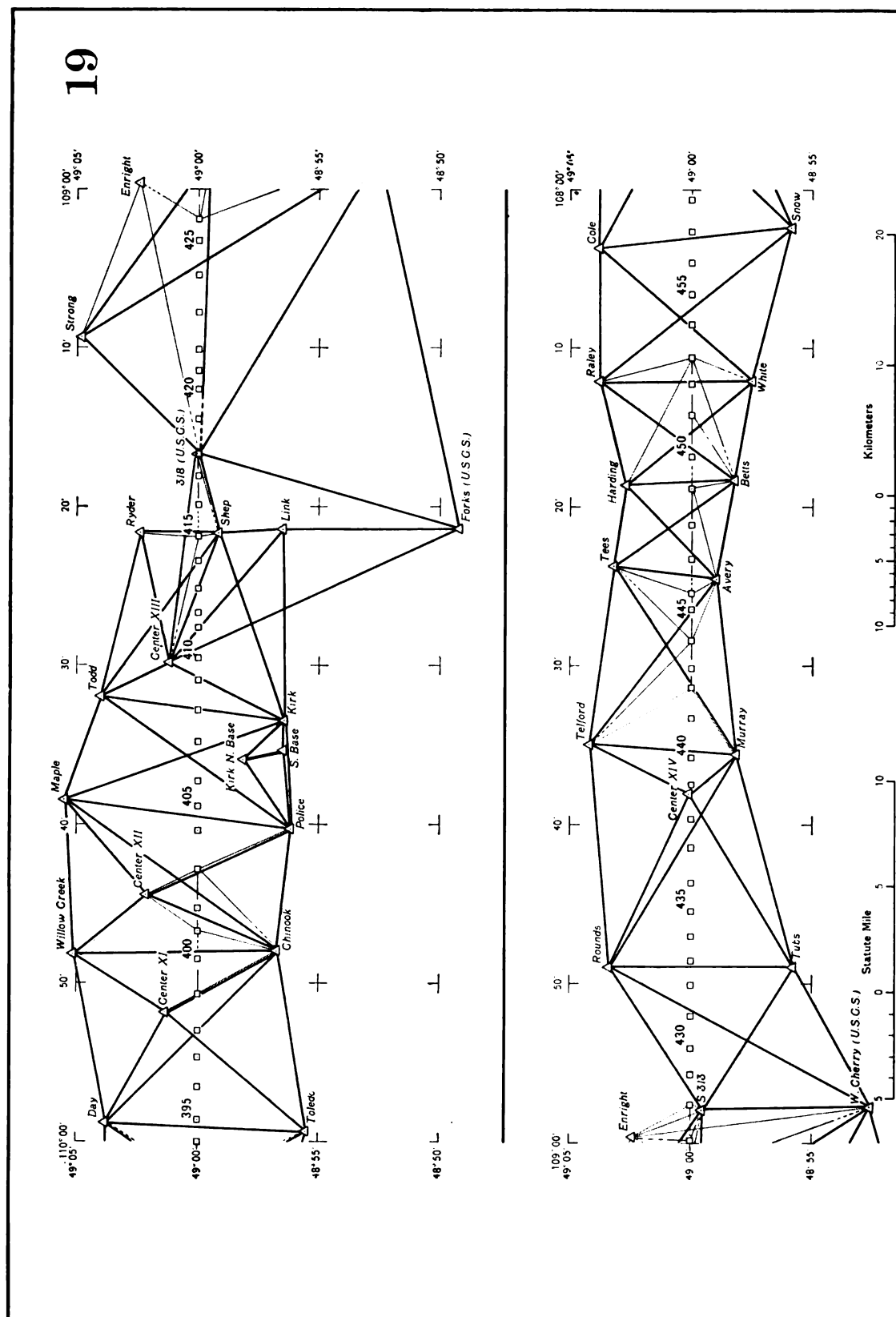
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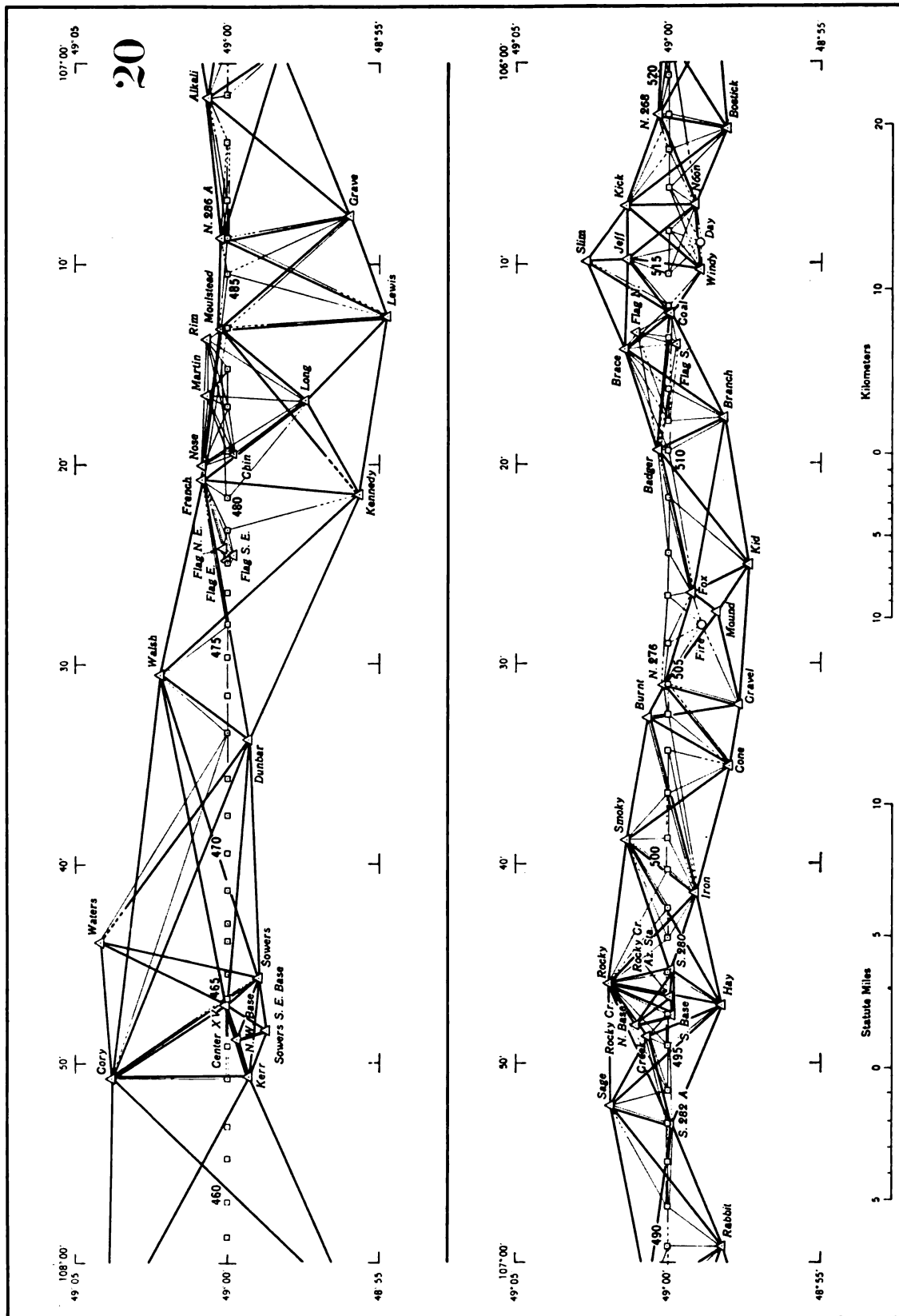


TRIANGULATION, MAJOR AND MINOR SCHEMES



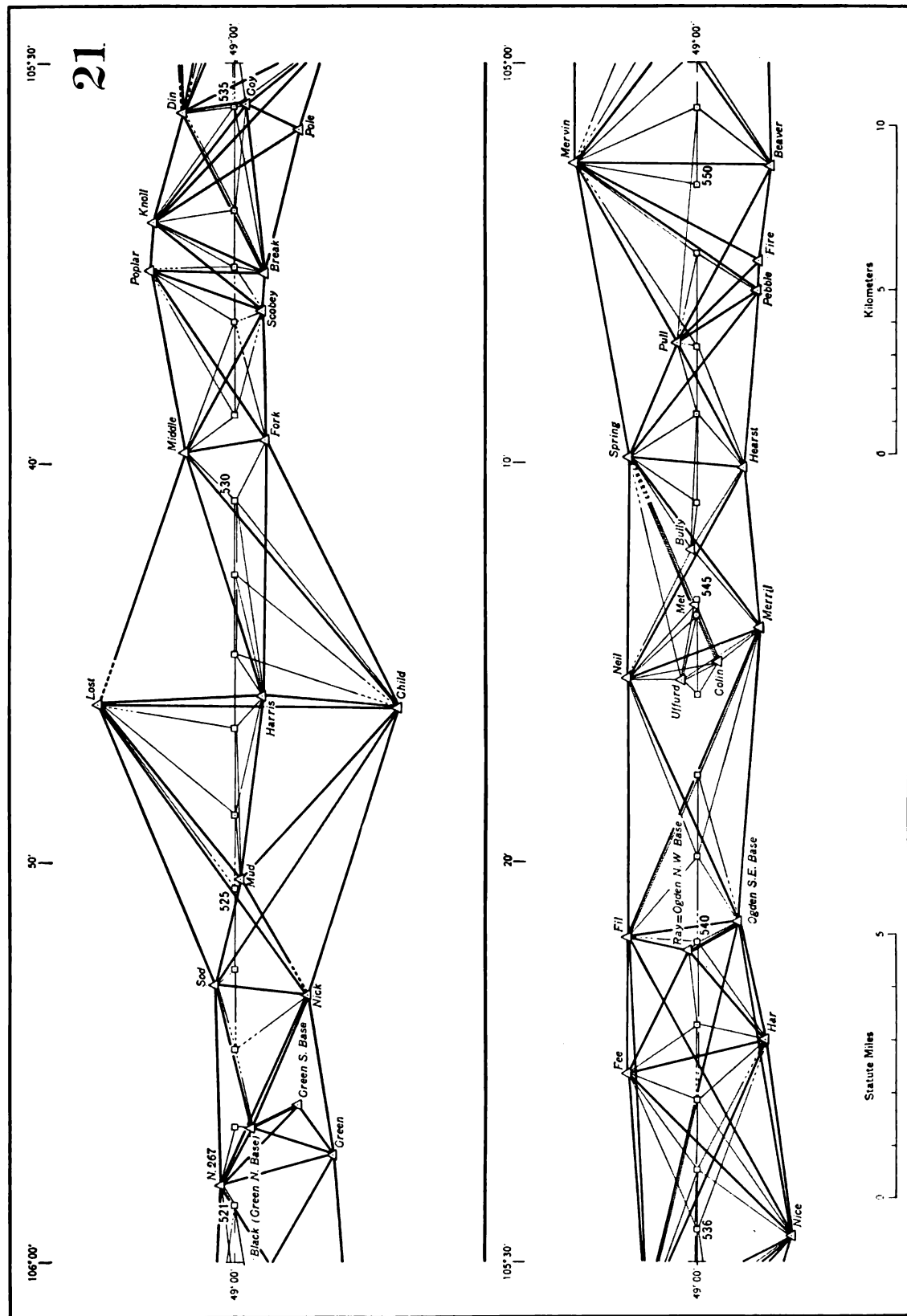


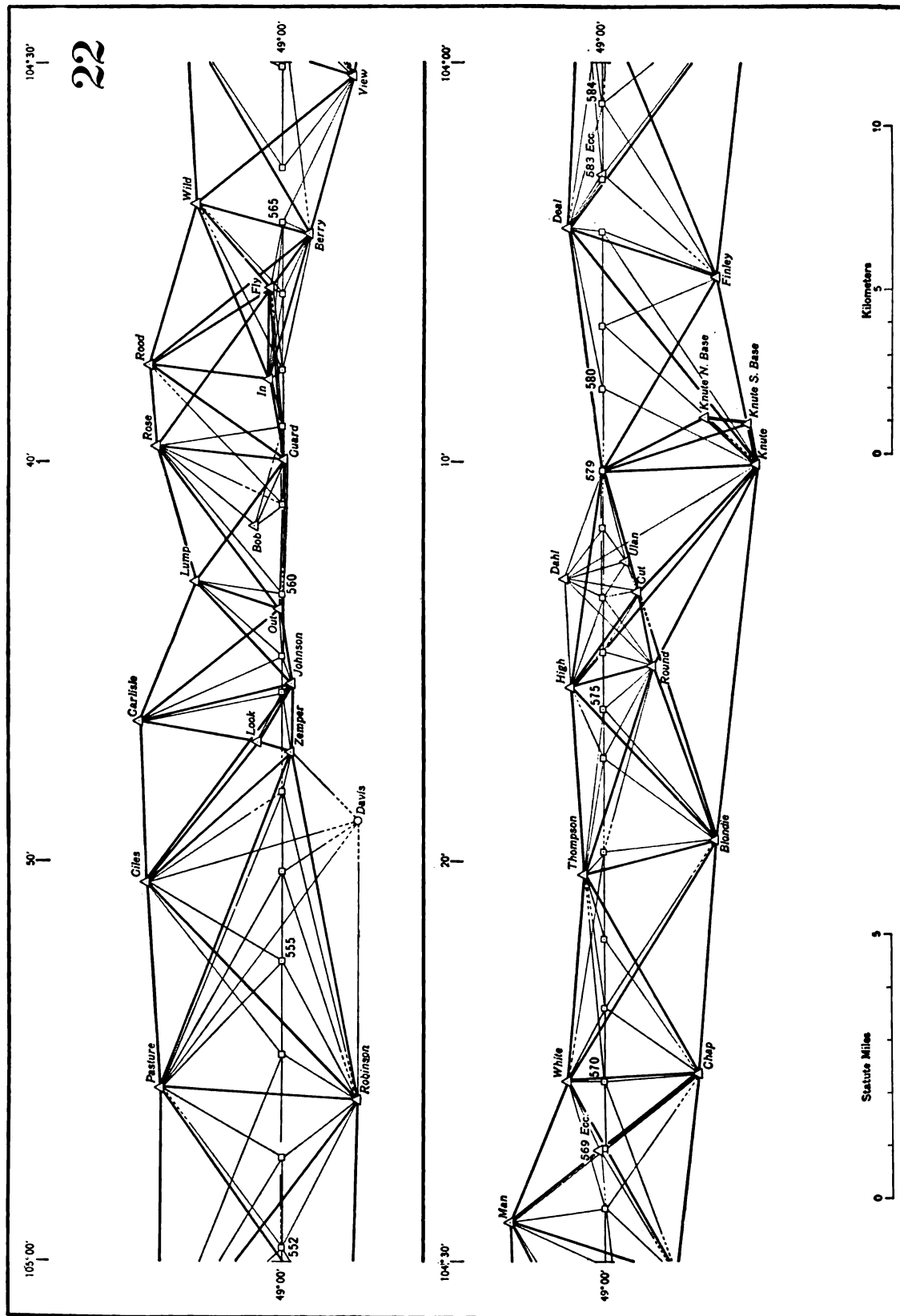




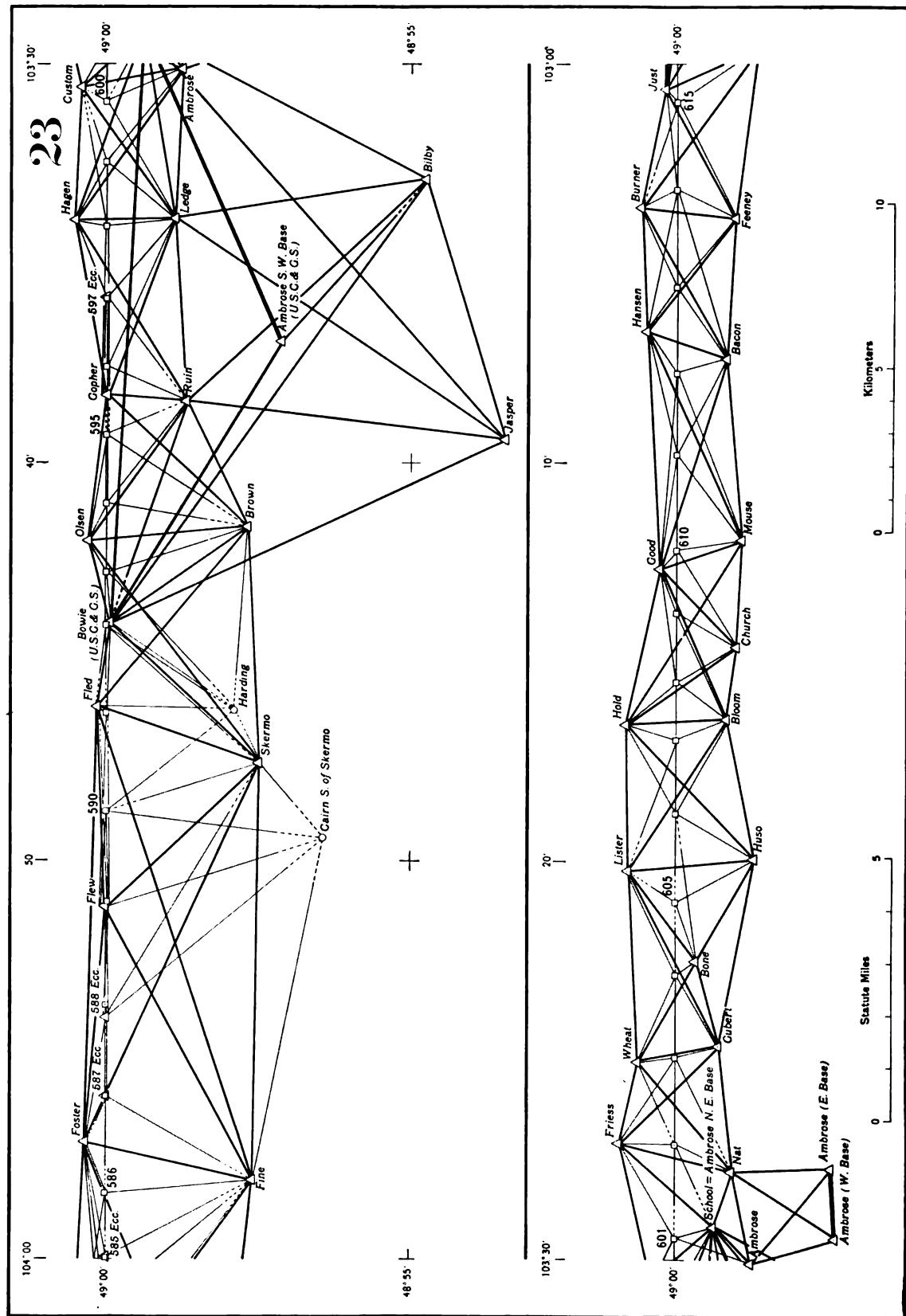
TRIANGULATION, MAJOR AND MINOR SCHEMES

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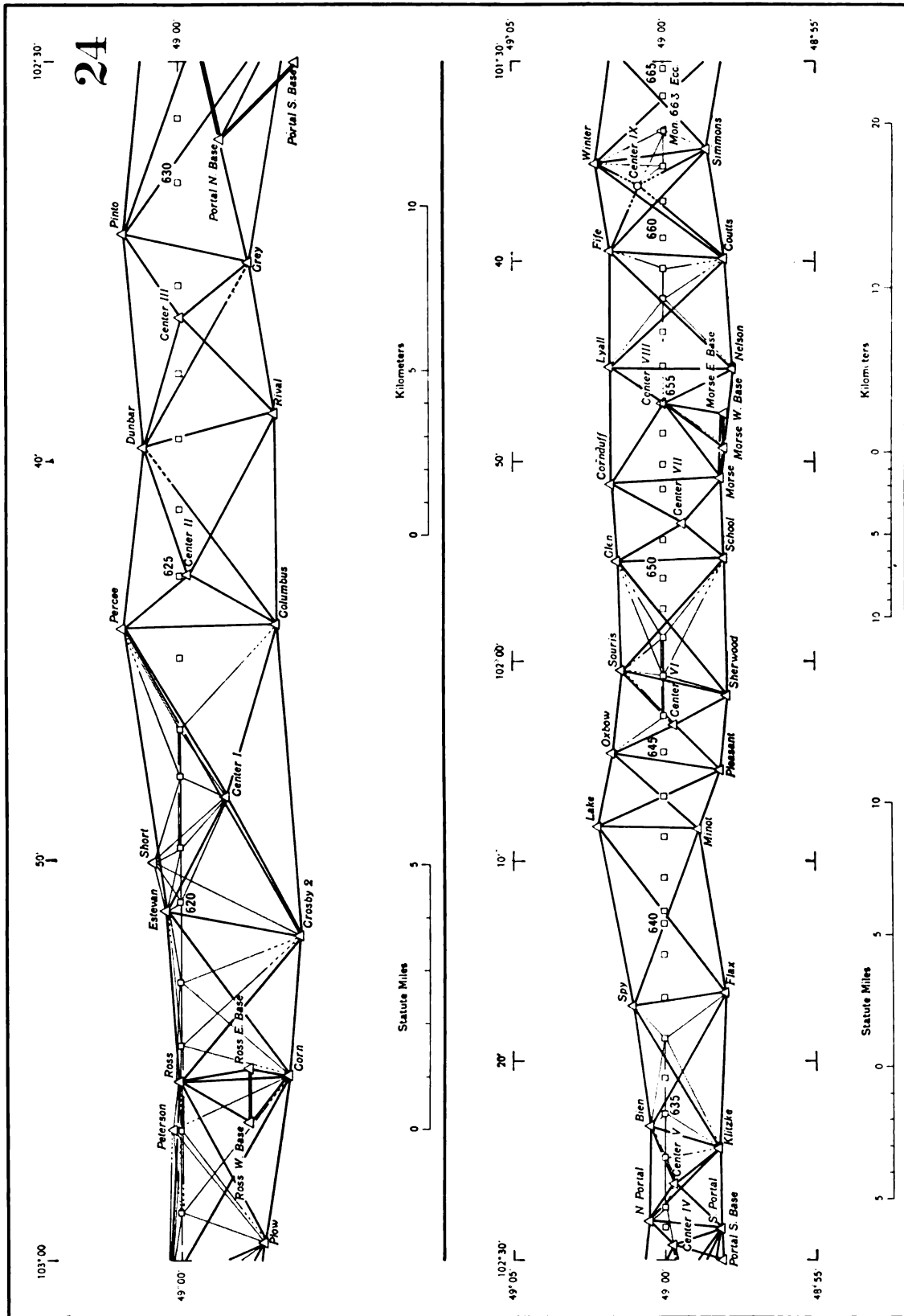




TRIANGULATION, MAJOR AND MINOR SCHEMES

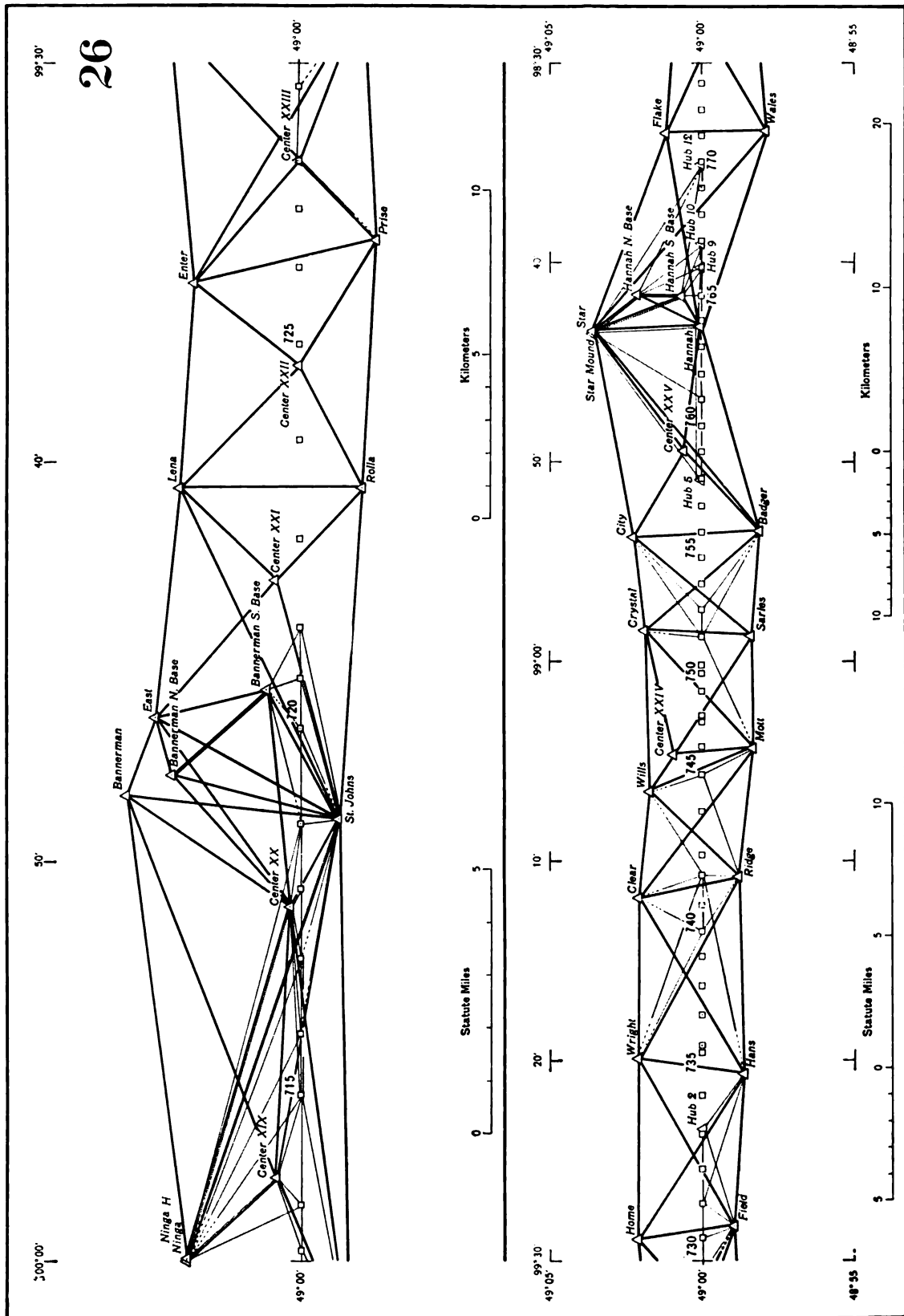


TRIANGULATION, MAJOR AND MINOR SCHEMES

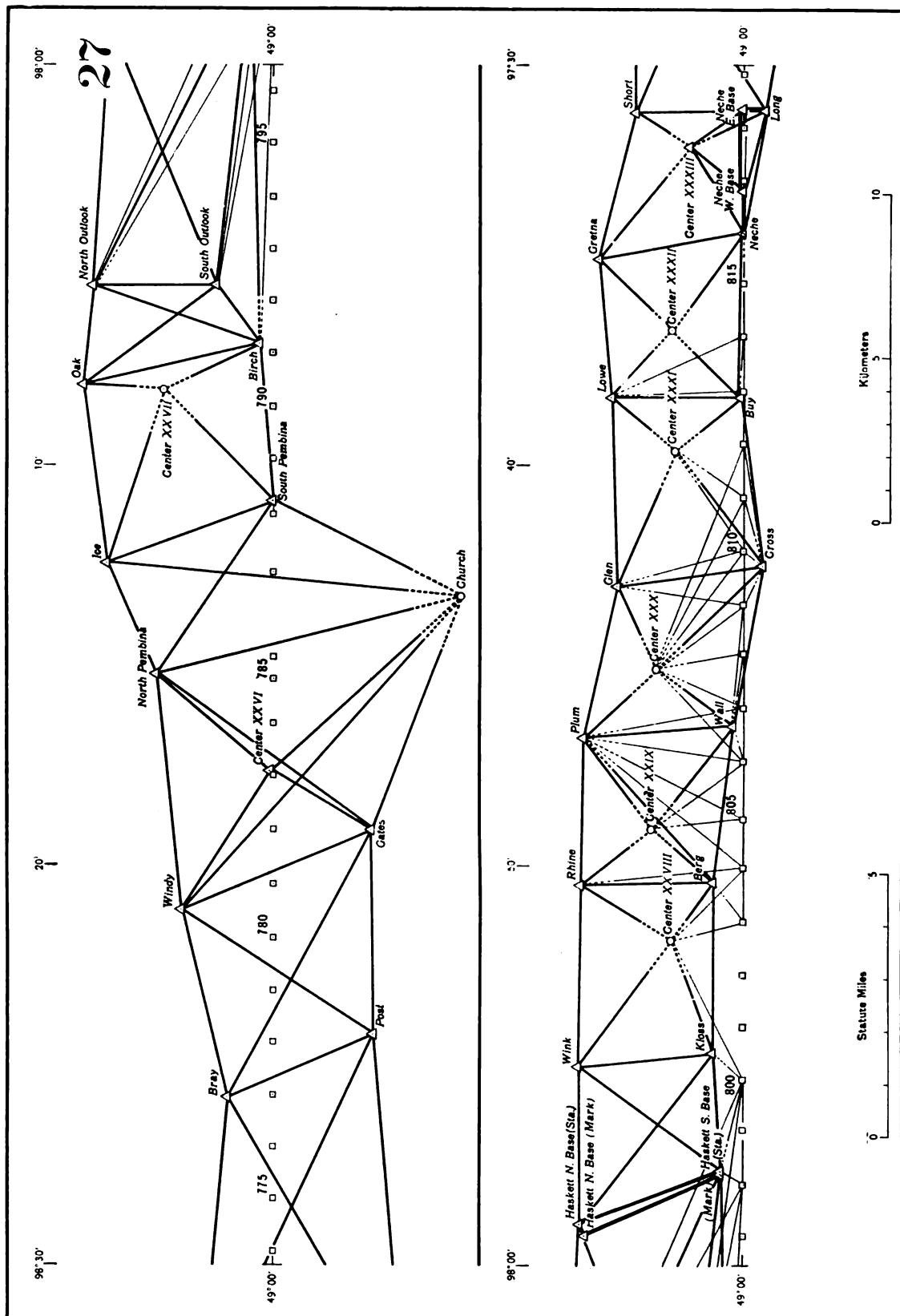


TRIANGULATION, MAJOR AND MINOR SCHEMES

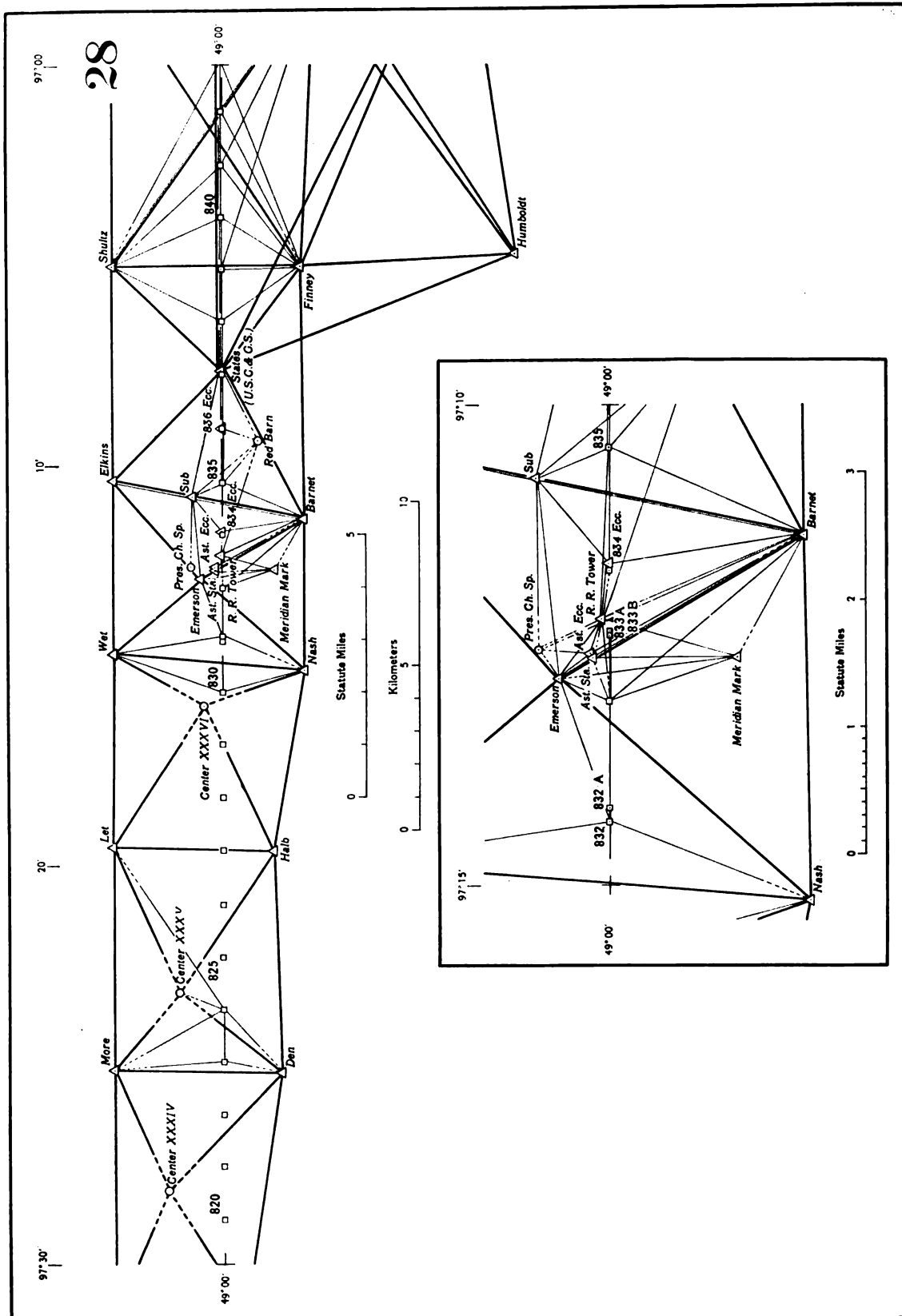




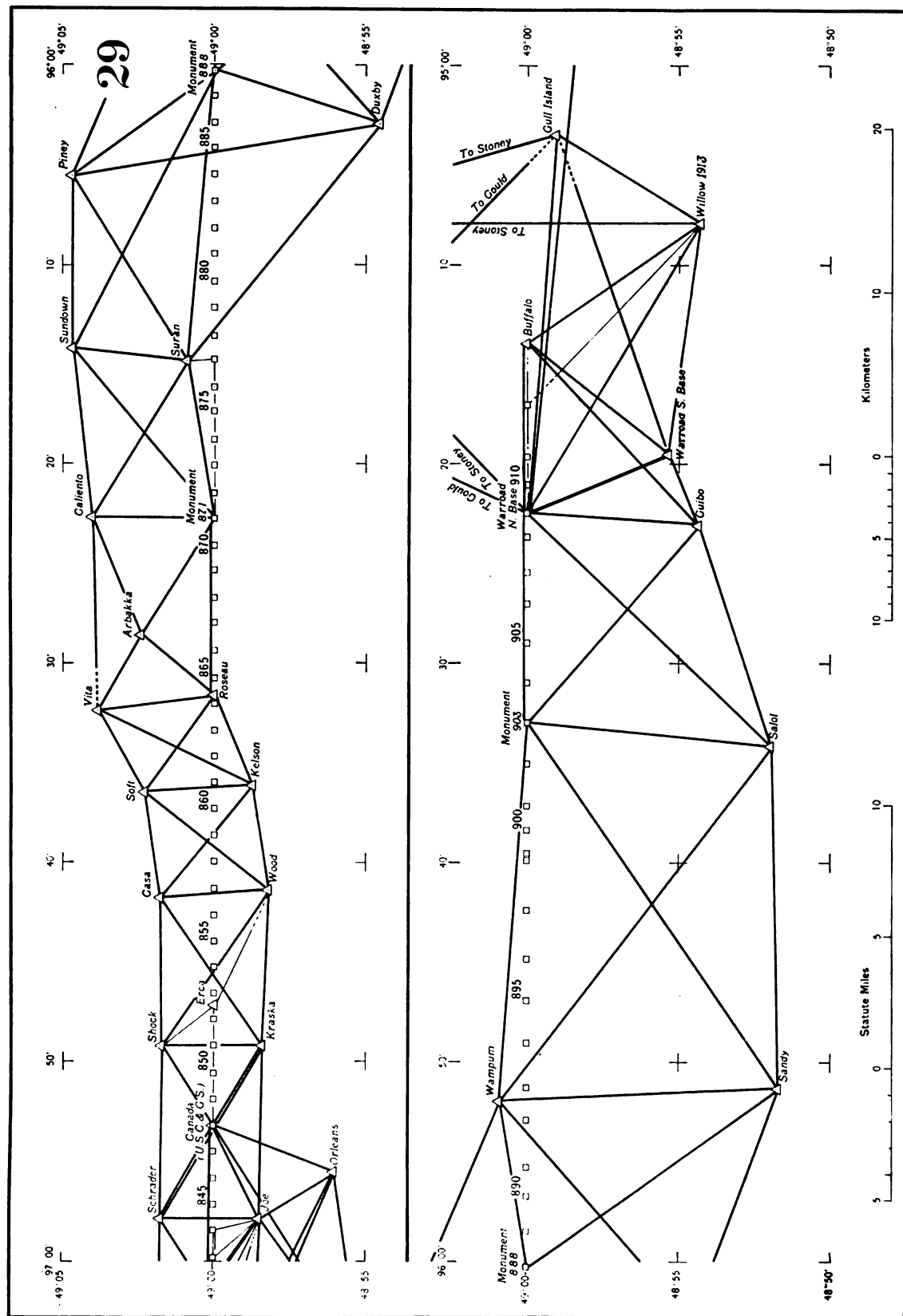




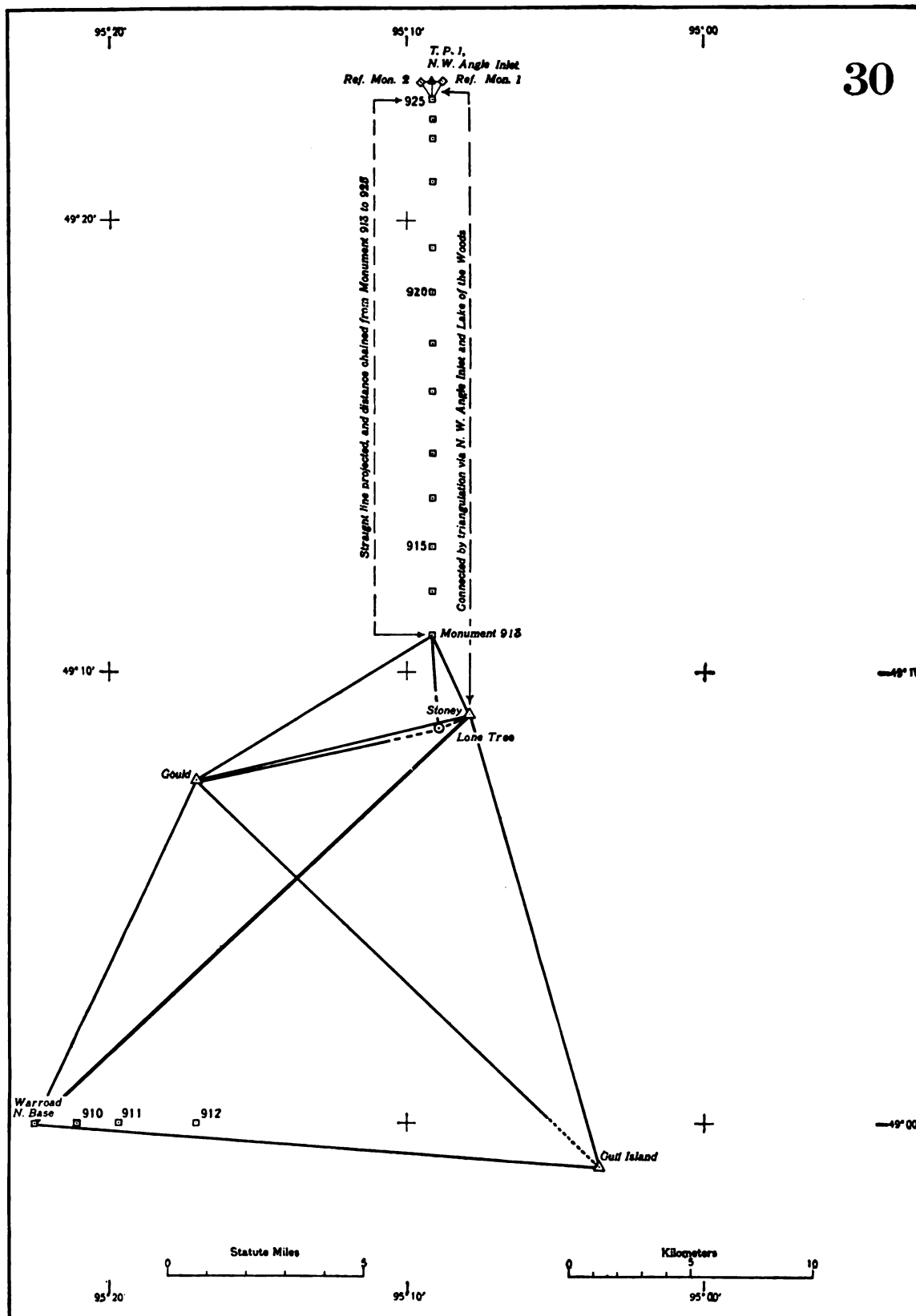
TRIANGULATION, MAJOR AND MINOR SCHEMES



TRIANGULATION, MAJOR AND MINOR SCHEMES



TRIANGULATION, MAJOR AND MINOR SCHEMES



TRIANGULATION AND TRAVERSE, MAJOR AND MINOR SCHEMES



# INDEX TO TRIANGULATION AND TRAVERSE STATIONS

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	<i>Page</i>	<i>Page</i>	<i>Page</i>		<i>Page</i>	<i>Page</i>	<i>Page</i>
Ack	290	408	452	Benson	254	334	428
Agate	258	352	434, 435	Berg	292		454
Airy	308		442	Berry	284	401	449
Akamina	312	426	443	Betts	280	393	446
Alameda school	268	373	435	Bevis	275	384	443
Alkabo	258	352	434, 435	Bien	287		451
Alkabo school	267	371	434, 435	Bienfait school	267	372	435
Alkali	281	395	447	Big Butte	257	348	433
Alkali (G. S. of C.)	257	348	433	Bilby	286	403	450
Alma	264	366	432	Birch	292		454
Altona	261	359	437	Birch Point	254	334	428, 438
Altona mill chimney	271	378	437	Black	295	414	439
Amadis	295		439	Black = Green north base	282	397	448
Ambrose	285	403	450	Blacktail	279	391	445
Ambrose (U. S. C. & G. S.)	259	352	435	Blondie	285	401	449
Ambrose east base	286	403	450	Bloom	286	404	450
Ambrose northeast base = School	259, 285	353	435, 450	Bluel	259	355	435
Ambrose school	267	371	435	Bluff	277	388	444
Ambrose southwest base	259, 286	353	435, 450	Blum	258	349	433
Ambrose west base	286	403	450	Bob	323	427	449
Anarchist	255	338	429	Bodie	255	339	430
Antelope	277	388	444	Bois	290	408	452
Antelope (U. S. C. & G. S.)	256	345	432	Boissevain church	270	375	436
Antler	289		452	Bolster	274	381	440
Antler church	269	374	435	Bonaparte	263, 274	362	429, 430, 440
Arbakka	294		456	Bone	286		450
Arnold	314	426	444	Border	309	424	442
Ashe	278	390	445	Bosek	300	419	440
Ashnola	273	380	440	Bostick	282	397	447
Audry	288		452	Bottineau	289	407	452
Avenue	254	335	428, 438	Boundary east base	256	344	432
Avery	280	393	446	Boundary Monument No. 12, Montana-Idaho state line	263		430
Bab	306		442	Boundary west base	256	344	432
Bacon (North Dakota)	286	404	450	Bowbells water tank	268	373	435
Bacon (U. S. C. & G. S.)	254	336	429	Bowdich	276	384	443
Bacon (U. S. G. S.)	272	336	429	Bowen	304	421	441
Badger (North Dakota)	291		453	Bowie	259, 285	353	435, 450
Badger (Saskatchewan)	282	396	447	Brace	282	396	447
Bake	288		452	Branch	282	396	447
Balan	295	415	439	Bray	291		454
Baldy (British Columbia)	276	385	443	Break	283	398	448
Baldy (Washington)	304	421	442	Breed	278	390	445
Balsam	274	381	440	Bride	302	420	440
Bannerman	290		453	Briquet plant, water tank	268	372	435
Bannerman north base	290	409	453	Broadwood	255	341	431
Bannerman south base	290	409	453	Bromhead church	267	371	435
Bar 5	279	391	445	Brown	285	402	450
Barnet	293	412	455	Bruce (Montana)	258	351	434
Basin	315		444	Bruce (Vancouver Island)	254	334	428
Bathgate elevator	271	378	437	Brush	298	417	439, 440
Baun	308		442	Buck	275	382	441, 442
Bear	278	390	445	Bud	311	426	443
Beaver	284	400	448	Buffalo	294		456
Beaver (U. S. C. & G. S.)	263, 275	363	430, 442	Bully	322	427	448
Beazer	256	343	431	Bunch	277	387	444
Belly	276	386	444	Bunker Hill	299	418	440
Belly East	313	426	444	Burke	275	383	442, 443
Bench	264, 277	364	432, 444	Burner	286	405	450
Bend	277	388	444	Burnt	282	395	447
				Buy	292		454

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	Page	Page	Page		Page	Page	Page
Cairn.....	278	389	444	Center XIX.....	290	408	453
Cairn south of Skermo.....	325		450	Center XX.....	290	409	453
Caliento.....	294	413	456	Center XXI.....	290	409	453
Caliento (G. S. of C.).....	261	360	437	Center XXII.....	290		453
Callahan.....	298	418	440	Center XXIII.....	290	410	453
Calvin school.....	270	376	436	Center XXIV.....	291		453
Camas.....	296	415	439	Center XXV.....	291		453
Cameron elevator.....	269	374	435	Center XXVI.....	291		454
Campbell.....	256, 276	342	431, 443	Center XXVII.....	292		454
Campbell No. 1.....	313	426	444	Center XXVIII.....	292		454
Campbell S. W.....	276	386	444	Center XXIX.....	292		454
Canada.....	276	385	443	Center XXX.....	292		454
Canada (U. S. C. & G. S.).....	261, 293	359	437, 456	Center XXXI.....	292		454
Cantel.....	288		452	Center XXXII.....	292		454
Carbury school.....	269	374	436	Center XXXIII.....	292		454
Caribou.....	275	384	443	Center XXXIV.....	293		455
Carievale elevator.....	268	373	435	Center XXXV.....	293		455
Carlisle.....	284	400	449	Center XXXVI.....	293		455
Carman water tank.....	271	378	436	Chap.....	284	401	449
Carson azimuth station.....	303	421	441	Check.....	300		440
Carter.....	256	342	431	Cherry.....	257	348	433
Cartwright church.....	270	376	436	Chester.....	264, 279	365	432, 445
Casa.....	293	413	456	Chief Mountain.....	276	386	444
Cascade.....	275	382	441	Chief North.....	313	426	444
Castle.....	304	421	441	Child.....	283	397	448
Cathedral.....	299	419	440	Chilliwick.....	295	414	439
Cavers.....	261	358	436	Chin.....	318		447
Center (G. S. of C.).....	257	348	433	Chinook.....	279	392	433, 446
Center (Montana).....	277	388	444	Chopaka.....	273	338	429, 440
Center (Idaho).....	307	423	442	Chopaka (U. S. C. & G. S.).....	255	338	429
Center I (Alberta).....	278	389	445	Christianson.....	279	391	445
Center I (North Dakota).....	287		451	Christina.....	255	339	430
Center II (Montana).....	278	390	445	Chuckanut.....	272	379	439
Center II (North Dakota).....	287	405	451	Church (North Dakota, Cavalier County).....	291		454
Center III (Alberta).....	278	390	445	Church (North Dakota, Divide County).....	286	404	450
Center III (North Dakota-Saskatchewan boundary).....	287		451	Church (U. S. C. & G. S.).....	254	336	428, 429, 439
Center IV (Montana).....	278	390	445	Church No. 1.....	267	371	434, 435
Center IV (North Dakota).....	287		451	Church No. 2.....	267	371	435
Center V (Montana).....	279	390	445	Church No. 3.....	267	371	435
Center V (North Dakota).....	287		451	Church No. 4.....	268	373	435
Center VI (Alberta).....	264, 279	366	432, 445	Church No. 5.....	268	373	435
Center VI (North Dakota).....	288		451	Church No. 6.....	268	373	435
Center VII (Montana).....	279	391	445	Church No. 7.....	269	374	435
Center VII (North Dakota).....	288		451	Church No. 8.....	269	374	436
Center VIII (Montana).....	279		445	Church No. 9.....	269	374	436
Center VIII (Saskatchewan).....	288	406	451	Church No. 10.....	271	377	436
Center IX (Montana).....	279	391	445	Churchill Lookout.....	304	421	441, 442
Center IX (Saskatchewan).....	288		451	City.....	291	410	453
Center X (Alberta).....	279	391	445	Clay Butte.....	258	350	434
Center X (North Dakota).....	288	407	452	Claydon.....	257	348	433
Center XI (Manitoba).....	289	407	452	Clear (Manitoba).....	291		453
Center XI (Saskatchewan).....	279	391	446	Clear (Montana).....	277	388	444
Center XII (Manitoba).....	289		452	Clearwater.....	260	357	436
Center XII (Saskatchewan).....	279	392	446	Clearwater elevator.....	270	376	436
Center XIII (Manitoba).....	289		452	Clement.....	274	382	441
Center XIII (Saskatchewan).....	280	392	446	Cleveland.....	313	426	444
Center XIV.....	280	393	446	Cliff.....	278	389	444
Center XV (North Dakota).....	289		452	Climax.....	257	348	433
Center XV (Saskatchewan).....	265, 281	369	433, 447	Clyde church.....	270	376	436
Center XVI.....	289		452	Coal.....	282	396	447
Center XVII.....	289	408	452	Coffin.....	278	389	445
Center XVIII.....	328	427	452	Cole.....	280	393	446
				Colgan school.....	267	371	435
				Colin.....	322		448
				Columbia.....	305		442
				Columbus.....	287	405	451
				Columbus church.....	267	372	435
				Cone (British Columbia).....	305	421	442
				Cone (Montana).....	282	395	447

# INDEX TO TRIANGULATION AND TRAVERSE STATIONS

461

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	Page	Page	Page		Page	Page	Page
Constitution	254	335	428	D. L. S. No. 18	266	370	434
Continental	307	423	442	D. L. S. No. 19	266	370	434
Cook	259	354	435	D. L. S. No. 20	266	370	434
Cope	296	416	439	D. L. S. No. 21	266	370	434, 435
Copley	289		452	D. L. S. No. 22	266	370	434, 435
Copper	274	381	440, 441	D. L. S. No. 23	267	371	435
Copper Butte	263	363	430	D. L. S. No. 24	267	371	435
Corn	286	405	451	D. L. S. No. 25	267	372	435
Cornduff	288		451	D. L. S. No. 26	267	372	435
Corner	278	389	444	D. L. S. No. 27	267	372	435
Cory	280	393	447	D. L. S. No. 28	268	372	435
Coulter church	269	374	435, 436	D. L. S. No. 29	268	372	435
Coulter water tank	269	374	435	D. L. S. No. 30	268	373	435
Coutts	288		451	D. L. S. No. 31	268	373	435
Coutts N. W. base	278	389	445	D. L. S. No. 32	268	373	435
Coutts S. E. base	278	389	445	D. L. S. No. 33	269	374	435
Cowan	288		452	D. L. S. No. 34	269	374	435, 436
Coy	283	398	448	D. L. S. No. 35	269	375	436
Cracker	256	343	431	D. L. S. No. 36	270	375	436
Crawford	300	419	440	D. L. S. No. 37	270	375	436
Creek	281	395	447	D. L. S. No. 38	270	375	436
Creek (U. S. C. & G. S.)	272	379	438	D. L. S. No. 39	270	376	436
Crescent	306	422	442	D. L. S. No. 40	271	377	436
Creston	263	363	430	D. L. S. No. 41	271	378	436, 437
Crook	278	389	444	D. L. S. No. 42	271	378	437
Crosby	259	352	435	D. L. S. No. 43	271	378	437
Crosby 2	287	405	451	D. L. S. No. 44	271	378	437
Crosby courthouse	267	372	435	Dooley	258	352	434
Cross	292	411	454	Dooley school	266	370	434
Crossley	256	343	431	Douglas	254	335	428
Crystal	291		453	Drayton I.	272	378	438
Crystal City church	270	376	436	Duff	307	423	442
Custom	285		450	Dunbar (G. S. of C.)	259	354	435
Cut	266, 285	371	434, 449	Dunbar (Montana)	281	394	447
D	296	415	439	Dunbar (Saskatchewan)	287		451
Dagon	306	422	442	Dungarvan	256	342	431
Dahl	324	427	449	Dunseith	260	356	436
Danville	303	421	441	Duxby	294	413	456
Danville east base	274	382	441	E	296	416	439
Danville west base	274	382	441	Eagle	274	381	441
Darlingford	261	358	436	Earle	300	419	440
Darlingford elevator	271	377	436	East	290	409	453
Davis (Montana)	323		449	East Butte	278	390	445
Davis (Washington)	254, 273	336	429	Eddyside	258	351	434
Day (Montana)	320		447	Edmund	257	349	433
Day (Saskatchewan)	279	391	446	Elcott elevator	268	373	435
Deal	285	402	449	Elkins	293	412	455
Declercq	260	356	436	Ella	299	418	440
Delta east base	254	334	428, 438	Elva	289		452
Delta west base	254	334	428, 438	Emerson	293		455
Den	293		455	Emerson astronomic sta- tion	331	427	455
Din	283	398	448	Emerson astronomic sta- tion ecc	331		455
Discovery	254	335	428	Emerson meridian mark	331		455
Divide (Montana)	256	343	431	Emerson Presbyterian church spire	331		455
Divide (Saskatchewan)	265	368	433	Emerson railroad tower	331	427	455
D. L. S. No. 1	265	368	433	End	273	380	440
D. L. S. No. 2	265	368	433	Enright	317	427	446
D. L. S. No. 3	265	369	433	Enter	290	410	453
D. L. S. No. 4	265	369	433	Enterprise elevator	270	375	436
D. L. S. No. 5	265	369	433	Erca	332		456
D. L. S. No. 6	265	369	433	Estevan	287		451
D. L. S. No. 7	265	369	433	Estevan (G. S. of C.)	259	354	435
D. L. S. No. 8	265	369	433	Estevan school	267	372	435
D. L. S. No. 9	265	369	433	Estevan water tank	267	372	435
D. L. S. No. 10	266	369	434	Ewing (U. S. C. & G. S.)	255	341	430, 431
D. L. S. No. 11	266	370	434	Ewing (U. S. G. S.)	275	341	430, 431, 442, 443
D. L. S. No. 12	266	370	434	Extra	308		442
D. L. S. No. 13	266	370	434				
D. L. S. No. 14	266	370	434				
D. L. S. No. 15	266	370	434				
D. L. S. No. 16	266	370	434				
D. L. S. No. 17	266	370	434				



Station	Position	Description	Sketch	Station	Position	Description	Sketch
	Page	Page	Page		Page	Page	Page
F	296	416	439	Giles (British Columbia)	300	419	440
Facer	307	423	442	Giles (Saskatchewan)	284	400	449
Fair	290	408	452	Gill	302	420	440
Fairfax church	269	375	436	Gillespie	255, 274	339	429, 430, 440
Fairhall southeast base	260	357	436	Gilpin	274	382	441
Fallison	260	357	436	Glacier	273	336	429, 439
Fallison elevator	270	376	436	Glacier (U. S. C. & G. S.)	254	336	429, 439
Fast	262	360	437	Glen (Manitoba)	292		454
Fee	283	399	448	Glen (Saskatchewan)	288		451
Feeney	286	404	450	Glentana	258	350	434
Field (North Dakota, Bottineau County)	290	408	452	G. L. O. No. 1	265	368	433
Field (North Dakota, Towner County)	290	410	453	G. L. O. No. 2	265	369	433
Fife	288		451	G. L. O. No. 3	265	369	433
Fife Lake	258	350	434	G. L. O. No. 4	265	369	433
Fil	283	399	448	G. L. O. No. 5	265	369	433
File	297		439	G. L. O. No. 6	265	369	433
Fine	285	402	450	G. L. O. No. 7	265	369	433, 434
Finley	285	402	449	G. L. O. No. 8	266	369	434
Finney	293	412	455	G. L. O. No. 9	266	369	434
Fir	274	381	441	G. L. O. No. 10	266	370	434
Fire (Montana, Daniels County)	266, 284	370	434, 448	G. L. O. No. 11	266	370	434
Fire (Montana, Valley County)	320	427	447	G. L. O. No. 12	266	370	434
Fish	290	408	452	G. L. O. No. 13	266	370	434
Flag east of Mon. 478	318		447	G. L. O. No. 14	266	370	434
Flag north of Mon. 513	320		447	G. L. O. No. 15	266	370	434
Flag N. E. of Mon. 478	318		447	G. L. O. No. 16	266	370	434
Flag south of Mon. 513	320		447	G. L. O. No. 17	266	371	435
Flag S. E. of Mon. 478	318		447	G. L. O. No. 18	267	371	435
Flake	291		453	G. L. O. No. 19	267	371	435
Flatiron	311		443	G. L. O. No. 20	267	372	435
Flax	287		451	G. L. O. No. 21	267	372	435
Flaxton	259	354	435	G. L. O. No. 22	268	372	435
Flaxton school	268	372	435	G. L. O. No. 23	268	372	435
Flaxville	258	351	434	G. L. O. No. 24	268	373	435
Flaxville church	266	370	434	G. L. O. No. 25	268	373	435
Fled	285	402	450	G. L. O. No. 26	268	373	435
Flew	285	402	450	G. L. O. No. 27	269	374	435
Fly	284	401	449	G. L. O. No. 28	269	374	435
Foot	277	388	444	G. L. O. No. 29	269	374	435, 436
Fork (British Columbia)	310	425	443	G. L. O. No. 30	264	365	432
Fork (Montana)	283	398	448	G. L. O. No. 31	264	365	432
Forks	264, 280	368	433, 446	G. L. O. No. 32	264	366	432
Fortuna school	267	371	435	G. L. O. No. 33	264	366	432
Foster	285	402	450	G. L. O. No. 34	264	366	432
Fox	282	396	447	G. L. O. No. 35	264	366	432
Frances	272	379	439	G. L. O. No. 36	264	367	432
Frank	302	421	441	G. L. O. No. 37	264	367	432
French	281	394	447	G. L. O. No. 38	264	367	433
Friess	286	403	450	G. L. O. No. 39	265	368	433
Frobisher elevator	268	373	435	G. L. O. No. 40	265	368	433
Frost	255, 275	341	431, 443	G. L. O. No. 41	265	368	433
Frosty	254, 273	337	429, 440	G. L. O. No. 42	264	367	433
Frosty West	273	380	440	G. L. O. No. 43	264	367	433
Fry	288		452	G. L. O. No. 43 ecc	265	368	433
G	296	416	439	G. L. O. No. 44	265	368	433
Gainsborough	260	355	435	G. L. O. No. 45	264	365	432
Galbreath	263, 277	363	431, 444	G. L. O. No. 46	264	364	432
Gap	277	387	444	G. L. O. No. 47	264	364	432
Garden	305		442	G. L. O. No. 48	264	364	432
Gardner (British Columbia)	254	334	428	G. L. O. No. 49	263	364	432
Gardner (Saskatchewan)	259	353	435	G. L. O. No. 50	263	364	431
Gates	291		454	G. L. O. No. 51	263	364	431
Gateway	275	384	443	G. L. O. No. 52	263	364	431
Gateway azimuth station	311	425	443	G. L. O. No. 53	263	364	431
Gateway north base	276	385	443	G. L. O. No. 53 ecc	263	364	431
Gateway south base	263, 276	363	431, 443	Glory	255	340	430
Geoduck	272		438	Goat (Montana-British Columbia boundary)	312	426	443
				Goat (Washington)	273	380	440
				Goat Peak Lookout	263	362	429
				Goertz	259	355	435
				Gold	310	425	443
				Goldstone	257	346	432
				Good (Manitoba)	289		452
				Good (Saskatchewan)	286	404	450
				Gopher	285	403	450

# INDEX TO TRIANGULATION AND TRAVERSE STATIONS

463

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	Page	Page	Page		Page	Page	Page
Gould.....	294	414	457	Horse.....	278	389	444
Govanlock.....	257	347	432, 433	Hozomeen.....	273	380	439, 440
Grand Forks.....	274	381	441	Hub 2.....	329		453
Grave.....	281	394	447	Hub 5.....	329		453
Gravel.....	282	396	447	Hub 9.....	329		453
Great Butte.....	307	422	442	Hub 10.....	329		453
Green (Montana, Lincoln County).....	255, 276	341	431, 443	Hub 12.....	329		453
Green (Montana, Daniels County).....	282	397	448	Hub 41.....	328		452
Green north base=Black.....	282	397	448	Humboldt.....	293	412	455
Green south base.....	282	397	448	Humboldt (G. S. of C.).....	261	359	437
Greenwood.....	255	339	430	Hump.....	274	381	440
Gretna.....	292		454	Hunter.....	275	383	442
Grey.....	287		451	Hurst.....	302	420	440
Griffith.....	278	390	445	Huso.....	286	404	450
Guard.....	284	400	449	Ice.....	291		454
Gubert.....	286	404	450	Iceberg.....	254	335	428
Guibo.....	294	414	456	In.....	284	401	449
Guilbault.....	262	360	437	Ingram.....	261	360	437
Gull Island.....	294	414	456, 457	International Boundary Monument—See Monument.....			
Gus.....	313		444	Irene.....	303	421	441
H.....	297	416	439	Iron.....	282	395	447
Hagen.....	285	403	450	Isar.....	295		439
Halb.....	293		455	J.....	297	416	439
Hall (Idaho).....	308	424	442	Jack (Alberta).....	313		444
Hall (Washington).....	255	340	430	Jack (Washington).....	273	379	440
Hall Lookout.....	308	424	442	Jackita.....	254	337	429
Halma.....	307	422	442	Jasper.....	286	403	450
Hannah.....	291	410	453	Jeff.....	282	396	447
Hannah north base.....	291	411	453	Joe.....	293	412	456
Hannah school.....	271	376	436	John.....	272	379	439
Hannah south base.....	291	411	453	Johnny.....	302	421	441
Hans.....	290	410	453	Johnson.....	284	400	449
Hansboro school.....	270	376	436	Johnson (G. S. of C.).....	260	356	436
Hansen.....	286	404	450	Joplin.....	257	346	432
Hansen (G. S. of C.).....	259	353	435	Jordan.....	301	419	440
Har.....	283	399	448	Just.....	286	405	450
Harding (North Dakota).....	325		450	K.....	297	417	439
Harding (Saskatchewan).....	280	393	446	Kabe.....	308		442
Hardy.....	274	381	441	Kaleida.....	261	358	436
Harper.....	309	424	442	Kaleida elevator.....	270	376	436
Harris.....	283	398	448	Kane elevator.....	271	378	437
Harris (G. S. of C.).....	259	355	435	Kay.....	300	419	440
Harvey.....	309	424	442	Kelly.....	255	340	430, 442
Haskett north base mark.....	292	411	454	Kelson.....	294	413	456
Haskett north base station.....	292		454	Kennedy.....	281	394	447
Haskett south base mark.....	292	411	454	Kerr.....	281	393	447
Haskett south base station.....	292		454	Kick.....	282	397	447
Hat.....	279	391	445	Kid.....	282	396	447
Havre.....	264, 279	367	432, 445	Kid (U. S. C. & G. S.).....	255	341	430, 431
Havre north base.....	257	347	433	Killarney.....	260	357	436
Havre south base.....	257	347	433	Killarney church.....	270	375	436
Hawkins.....	275	383	442	Kiln.....	311	425	443
Hay.....	281	395	447	Kintla.....	276	385	443
Hayden.....	260	355	435, 436	Kippen.....	256	345	432
Headlight Butte.....	264	364	432	Kirk.....	280	392	446
Hearst.....	283	399	448	Kirk north base.....	280	392	446
Hefty.....	276	385	443	Kirk south base.....	280	392	446
Hell Roaring.....	275	383	442	Kishenehn.....	276	385	443
High.....	266, 285	371	434, 449	Klitzke.....	287		451
Hill.....	256	345	432	Kloss.....	292		454
Hold.....	286	404	450	Knob.....	274	381	441
Holly.....	288		452	Knoll (Manitoba).....	289	407	452
Holmfield.....	260	357	436	Knoll (Saskatchewan).....	283	398	448
Holmfield school.....	270	375	436	Knute.....	285	401	449
Holt.....	289		452	Knute north base.....	285	402	449
Home.....	290		453	Knute south base.....	285	402	449
Homen church.....	271	377	436	Kootenai.....	275	384	443
Hooknose.....	306		442	Kop.....	279	391	445
Hope.....	289		452				
Horn.....	275	382	441, 442				

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	<i>Page</i>	<i>Page</i>	<i>Page</i>		<i>Page</i>	<i>Page</i>	<i>Page</i>
Kramer church	269	375	436	Margaret elevator	270	375	436
Kraska	293	412	456	Margaret northwest base	260	357	436
Kronsgart elevator	271	377	437	Mariapolis church	270	376	436
Kuroki elevator	269	374	435	Martin	318		447
L	297	416	439	Martin (G. S. of C.)	259	354	435
Laird	279	391	445	Mather church	270	376	436
Lake (Alberta)	278	388	444	Mawer	306	422	442
Lake (Saskatchewan)	287		451	McCormick	256	345	432
Lake (U. S. C. & G. S.)	263, 275	363	430, 442	McGillivray	259	354	435
Lake Qu'Appelle church	267	371	435	McGuire	295	415	439
Lake View	263, 273	362	429, 440	McQuade	262	360	437
Landa church	269	374	436	Meeks	256	344	432
Landslide	256	344	432	Melvin	305	422	442
Larson church	267	372	435	Menisino	261	360	437
Ledge	285	403	450	Merril	283	399	448
Lem	314		444	Mervin	284	351	434, 448
Lemanasky (U. S. C. & G. S.)	255	338	429	Mervin (G. S. of C.)	258	351	434
Lemanasky (U. S. G. S.)	273	338	429, 440	Messers	259	352	435
Lena	290	409	453	Met	322		448
Lena (G. S. of C.)	260	356	436	Middle (Saskatchewan)	283	398	448
Lena elevator	270	375	436	Middle (Washington)	296	416	439
Leona	255	339	430	Middleboro	262	361	437
Leroy church	271	378	437	Midway	274	381	441
Let	293		455	Midway astronomic station	303		441
Letellier	261	359	437	Midway azimuth station	303		441
Letellier elevator	271	378	437	Milk (Alberta; Range 12 West, fourth meridian)	278	390	445
Lewis	281	394	447	Milk (Alberta; Range 23 West, fourth meridian)	277	387	444
Lick	310	425	443	Milk (U. S. C. & G. S.)	256	346	432
Lightning	273	380	439, 440	Miller (Montana)	316	427	444
Lignite	259	354	435	Miller (Washington)	272	379	438
Lignite church	268	372	435	Minot	287		451
Lincoln	277	387	444	Minto church	269	375	436
Line	277	388	444	Minto school	269	375	436
Link	280	392	446	Mission	309	424	442
Lister	286	404	450	Mix	300	419	440
Little Chopaka	301	420	440	Moberly	264, 278	365	432, 445
Little Mountain	254	334	428	Mohall	288		452
Little Snowy	307	423	442	Mohall (G. S. of C.)	260	355	435
Liumchen	295	415	439	Mohall water tank	269	374	435
Lock	289		452	Molson	301	420	440
Lodge	275	383	443	Monchy	257	349	433
Lomond	306		442	Monk	307	423	442
Lone Mountain	298	418	440	Monument 1	272		438
Lone Tree	294		457	Monument 4	272		438
Long (Montana)	258, 281	349	433, 447	Monument 5	272		438
Long (North Dakota)	293		454	Monument No. 12, Montana-Idaho boundary	263		430
Look	284	400	449	Monument 20	295		439
Lorin	314		444	Monument 30-A	295		
Lost (Alberta)	279	391	445	Monument 31	295		439
Lost (Saskatchewan)	283	398	448	Monument 41	295		439
Lowe	292		454	Monument 42	295		439
Lowe farm elevator	271	378	437	Monument 43	295		439
Lucky	257	348	433	Monument 44	295		439
Lump	284	400	449	Monument 44-A	295		439
Lyall	288		451	Monument 45	295		439
Lyleton	260	355	435	Monument 46	295		439
Lyleton school	269	374	435	Monument 47	295		439
M	297	416	439	Monument 48	295		439
Mack	298	418	440	Monument 49	295		439
Madoc	258	351	434	Monument 50	296		439
Madoc school	266	370	434	Monument 51	296		439
Mahon	275	383	442, 443	Monument 52	296		439
Maida	261	358	436	Monument 53	296		439
Malme	260	355	435, 436	Monument 54	296		439
Man	284	401	449	Monument 55	296		439
Manitou	261	358	436	Monument 56	296		439
Manitou Normal School	270	376	436	Monument 57	296		439
Manley	301	419	440	Monument 58	296		439
Manor	289		452	Monument 59	297		439
Maple	279	392	446				

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	<i>Page</i>	<i>Page</i>	<i>Page</i>		<i>Page</i>	<i>Page</i>	<i>Page</i>
Monument 60	297		439	Monument 132	302		440
Monument 61	297		439	Monument 133	302		440, 441
Monument 62	297		439	Monument 134	302		441
Monument 63	297		439	Monument 135	303		441
Monument 64	297		439	Monument 136	303		441
Monument 65	297		439	Monument 137	303		441
Monument 66	297		439	Monument 138	302		441
Monument 67	297		439	Monument 139	303		441
Monument 68	297		439	Monument 140	303		441
Monument 69	298		439	Monument 141	302		441
Monument 70	298		439	Monument 142	303		441
Monument 71	298		439	Monument 143	303		441
Monument 72	298		439	Monument 144	302		441
Monument 73	298		439	Monument 145	303		441
Monument 74	298		439, 440	Monument 146	303		441
Monument 75	298		440	Monument 147	303		441
Monument 76	298		440	Monument 148	303		441
Monument 77	298		440	Monument 149	303		441
Monument 78	299		440	Monument 150	303		441
Monument 79	298		440	Monument 151	303		441
Monument 80	299		440	Monument 152	303		441
Monument 81	299		440	Monument 153	303		441
Monument 82	299		440	Monument 154	303		441
Monument 83	298		440	Monument 155	303		441
Monument 84	299		440	Monument 156	304		441
Monument 85	299		440	Monument 157	304		441
Monument 85 ecc	299		440	Monument 158	304		441
Monument 86	299		440	Monument 159	304		441
Monument 87	299		440	Monument 160	304		441
Monument 88	299		440	Monument 161	304		441
Monument 89	299		440	Monument 162	304		441
Monument 90	299		440	Monument 163	304		441
Monument 91	300		440	Monument 164	304		441
Monument 92	300		440	Monument 165	304		441
Monument 93	299		440	Monument 166	304		441
Monument 94	300		440	Monument 167	304		441
Monument 95	300		440	Monument 168	304		441
Monument 96	300		440	Monument 169	304		441
Monument 97	300		440	Monument 170	305		441, 442
Monument 98	300		440	Monument 171	305		442
Monument 99	300		440	Monument 172	305		442
Monument 100	300		440	Monument 173	305		442
Monument 101	300		440	Monument 174	304		442
Monument 102	300		440	Monument 175	304		442
Monument 103	300		440	Monument 176	304		442
Monument 104	300		440	Monument 177	305		442
Monument 105	301		440	Monument 178	305		442
Monument 106	301		440	Monument 179	305		442
Monument 107	301		440	Monument 180	305		442
Monument 108	301		440	Monument 181	305		442
Monument 109	301		440	Monument 182	305		442
Monument 110	301		440	Monument 183	305		442
Monument 111	301		440	Monument 184	306		442
Monument 112	301		440	Monument 185	306		442
Monument 113	301		440	Monument 186	306		442
Monument 114	301		440	Monument 187	306		442
Monument 115	301		440	Monument 188	306		442
Monument 116	301		440	Monument 189	306		442
Monument 117	263		429, 440	Monument 190	306		442
Monument 118	263		429, 440	Monument 191	306		442
Monument 119	301		440	Monument 192	306		442
Monument 120	301		440	Monument 193	306		442
Monument 121	301		440	Monument 194	307		442
Monument 122	301		440	Monument 195	307		442
Monument 123	302		440	Monument 196	307		442
Monument 124	302		440	Monument 197	307		442
Monument 125	302		440	Monument 198	307		442
Monument 126	302		440	Monument 199	307		442
Monument 127	302		440	Monument 200	307		442
Monument 128	302		440	Monument 201	307		442
Monument 129	302		440	Monument 202	308		442
Monument 130	302		440	Monument 203	308		442
Monument 131	302		440	Monument 204	308		442

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	<i>Page</i>	<i>Page</i>	<i>Page</i>		<i>Page</i>	<i>Page</i>	<i>Page</i>
Monument 205	308		442	Monument 277	313		444
Monument 206	308		442	Monument 278	313		444
Monument 207	308		442	Monument 279	313		444
Monument 208	308		442	Monument 280	313		444
Monument 209	308		442	Monument 281	313		444
Monument 210	309		442	Monument 282	313		444
Monument 211	309		442	Monument 283	313		444
Monument 212	309		442	Monument 284	313		444
Monument 213	309		442	Monument 285	314		444
Monument 214	309		442	Monument 286	314		444
Monument 215	309		442	Monument 287	314		444
Monument 216	309		442	Monument 288	314		444
Monument 217	309		442	Monument 289	314		444
Monument 218	309		442	Monument 290	314		444
Monument 219	309		442	Monument 291	314		444
Monument 220	309		442	Monument 292	314		444
Monument 221	309		442	Monument 293	314		444
Monument 222	309		442	Monument 294	314		444
Monument 223	309		442, 443	Monument 295	314		444
Monument 224	309		443	Monument 296	314		444
Monument 225	310		443	Monument 297	314		444
Monument 226	310		443	Monument 298	314		444
Monument 227	310		443	Monument 299	314		444
Monument 228	310		443	Monument 300	315		444
Monument 229	309		443	Monument 301	315		444
Monument 230	310		443	Monument 302	315		444
Monument 231	310		443	Monument 303	315		444
Monument 232	310		443	Monument 304	315		444
Monument 233	310		443	Monument 305	315		444
Monument 234	310		443	Monument 306	315		444
Monument 235	310		443	Monument 307	315		444
Monument 236	310		443	Monument 308	315		444
Monument 237	310		443	Monument 309	315		444
Monument 238	310		443	Monument 310	315		444
Monument 239	310		443	Monument 311	315		444
Monument 240	311		443	Monument 312	315		444
Monument 241	311		443	Monument 313	315		444
Monument 242	311		443	Monument 314	315		444
Monument 243	311		443	Monument 315	315		444
Monument 244	311		443	Monument 316	315		444
Monument 245	311		443	Monument 317	315		444
Monument 246	311		443	Monument 318	315		444
Monument 247	311		443	Monument 319	316		444
Monument 247 ecc.	311	425	443	Monument 320	316		444
Monument 248	311		443	Monument 321	316		444
Monument 249	311		443	Monument 322	316		444
Monument 250	311		443	Monument 323	316		444
Monument 251	311		443	Monument 324	316		444
Monument 252	311		443	Monument 325	316		444
Monument 253	311		443	Monument 326	316		444
Monument 254	311		443	Monument 327	316		444
Monument 255	311		443	Monument 328	316		444
Monument 256	311		443	Monument 329	316		444
Monument 257	312		443	Monument 330	316		444
Monument 258	312		443	Monument 331	316		444
Monument 259	312		443	Monument 332	316		445
Monument 260	312		443	Monument 333	316		445
Monument 261	312		443	Monument 335	316		445
Monument 262	312		443	Monument 351	317		445
Monument 263	312		443	Monument 354	317		445
Monument 264	312		443	Monument 356	317		445
Monument 265	312		443	Monument 362	317		445
Monument 266	312		443	Monument 366	317		445
Monument 267	312		443	Monument 370	317		445
Monument 268	312		443	Monument 374	317		445
Monument 269	312		443	Monument 383	317		445
Monument 270	312		443	Monument 384	317		445
Monument 271	312		443	Monument 385	317		445
Monument 272	312		443	Monument 386	317		445
Monument 273	313		443	Monument 387	317		445
Monument 274	313		444	Monument 393	317		445
Monument 275	313		444	Monument 399	317		446
Monument 276	313		444	Monument 401	317		446

# INDEX TO TRIANGULATION AND TRAVERSE STATIONS

467

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	Page	Page	Page		Page	Page	Page
Monument 403	317		446	Monument 534	321		448
Monument 415	317		446	Monument 535	321		448
Monument 418	317		446	Monument 536	321		448
Monument 418 ecc	317		446	Monument 537	321		448
Monument 426	317		446	Monument 538	321		448
Monument 427	317		446	Monument 539	322		448
Monument 428	318		446	Monument 540	322		448
Monument 442	318		446	Monument 541	322		448
Monument 444	318		446	Monument 542	322		448
Monument 446	318		446	Monument 543	322		448
Monument 449	318		446	Monument 544	322		448
Monument 451	318		446	Monument 545	322		448
Monument 453	318		446	Monument 546	322		448
Monument 463	318		447	Monument 547	322		448
Monument 465	318		447	Monument 548	322		448
Monument 473 ecc	318		447	Monument 549	322		448
Monument 476	318		447	Monument 550	322		448
Monument 478	318		447	Monument 551	322		448
Monument 479	318		447	Monument 552	322		449
Monument 480	318		447	Monument 553	322		449
Monument 481	318		447	Monument 554	322		449
Monument 482	318		447	Monument 555	323		449
Monument 483	319		447	Monument 556	323		449
Monument 484	319		447	Monument 557	323		449
Monument 485	319		447	Monument 558	323		449
Monument 486	319		447	Monument 559	323		449
Monument 487	319		447	Monument 560	323		449
Monument 488	319		447	Monument 561	323		449
Monument 489	319		447	Monument 562	323		449
Monument 490	319		447	Monument 563	323		449
Monument 491	319		447	Monument 564	323		449
Monument 492	319		447	Monument 565	323		449
Monument 493	319		447	Monument 566	323		449
Monument 494	319		447	Monument 567	323		449
Monument 495	319		447	Monument 568	323		449
Monument 496	319		447	Monument 569	323		449
Monument 497	319		447	Monument 569 ecc	323		449
Monument 498	319		447	Monument 570	324		449
Monument 499	319		447	Monument 571	324		449
Monument 500	319		447	Monument 572	324		449
Monument 501	319		447	Monument 573	324		449
Monument 502	319		447	Monument 574	324		449
Monument 503	319		447	Monument 575	324		449
Monument 504	320		447	Monument 576	324		449
Monument 505	320		447	Monument 577	324		449
Monument 506	320		447	Monument 578	324		449
Monument 507	320		447	Monument 579	285		449
Monument 508	320		447	Monument 580	324		449
Monument 509	320		447	Monument 581	324		449
Monument 510	320		447	Monument 582	324		449
Monument 511	320		447	Monument 583	324		449
Monument 512	320		447	Monument 583 ecc	324		449
Monument 513	320		447	Monument 584	324		449
Monument 514	320		447	Monument 585	324		450
Monument 515	320		447	Monument 585 ecc	324		450
Monument 516	320		447	Monument 586	325		450
Monument 517	320		447	Monument 587	325		450
Monument 518	320		447	Monument 587 ecc	325		450
Monument 519	320		447	Monument 588	325		450
Monument 520	321		447	Monument 588 ecc	325		450
Monument 521	321		448	Monument 589	325		450
Monument 522	321		448	Monument 590	325		450
Monument 523	321		448	Monument 591	325		450
Monument 524	321		448	Monument 592	325		450
Monument 525	321		448	Monument 593	325		450
Monument 526	321		448	Monument 594	325		450
Monument 527	321		448	Monument 595	325		450
Monument 528	321		448	Monument 596	325		450
Monument 529	321		448	Monument 597	325		450
Monument 530	321		448	Monument 597 ecc	325		450
Monument 531	321		448	Monument 598	325		450
Monument 532	321		448	Monument 599	325		450
Monument 533	321		448	Monument 600	326		450

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	Page	Page	Page		Page	Page	Page
Monument 601	326		450	Monument 770	329		453
Monument 602	326		450	Monument 788	330		454
Monument 603	326		450	Monument 798	330		454
Monument 604	326		450	Monument 800	330		454
Monument 605	326		450	Monument 803	330		454
Monument 606	326		450	Monument 804	330		454
Monument 607	326		450	Monument 805	330		454
Monument 608	326		450	Monument 806	330		454
Monument 609	326		450	Monument 807	330		454
Monument 610	326		450	Monument 808	330		454
Monument 611	326		450	Monument 809	330		454
Monument 612	326		450	Monument 810	330		454
Monument 613	326		450	Monument 811	330		454
Monument 614	326		450	Monument 812	330		454
Monument 615	326		450	Monument 813	330		454
Monument 616	327		451	Monument 814	330		454
Monument 617	327		451	Monument 816	330		454
Monument 618	327		451	Monument 817	330		454
Monument 619	327		451	Monument 818	330		454
Monument 620	327		451	Monument 823	330		455
Monument 621	327		451	Monument 824	330		455
Monument 622	327		451	Monument 830	330		455
Monument 623	327		451	Monument 832	330		455
Monument 633	327		451	Monument 833	331		455
Monument 634	327		451	Monument 834	331		455
Monument 635	327		451	Monument 834 ecc	331		455
Monument 637	327		451	Monument 835	331		455
Monument 646	327		451	Monument 836	331		455
Monument 647	327		451	Monument 836 ecc	331		455
Monument 648	327		451	Monument 837	331		455
Monument 655	327		451	Monument 838	331		455
Monument 658	327		451	Monument 839	331		455
Monument 659	327		451	Monument 840	331		455
Monument 662	328		451	Monument 841	331		455
Monument 663 ecc	328		451	Monument 842	331		455
Monument 684	328		452	Monument 843	331		456
Monument 685	328		452	Monument 844	332		456
Monument 686	328		452	Monument 848	332		456
Monument 691	328		452	Monument 853	332		456
Monument 692	328		452	Monument 864	332		456
Monument 693	328		452	Monument 871	294		456
Monument 697	328		452	Monument 877	332		456
Monument 699	328		452	Monument 888	294		456
Monument 708	328		452	Monument 903	294		456
Monument 711	328		452	Monument 909	262, 294	361	456
Monument 712	328		452	Monument 912	332		456
Monument 713	328		453	Monument 913	294		457
Monument 714	328		453	Monument 925	332		457
Monument 715	328		453	Morden	261	358	436, 437
Monument 716	328		453	More	293		455
Monument 717	328		453	Morse	288	406	451
Monument 718	328		453	Morse east base	288	406	451
Monument 719	328		453	Morse west base	288	406	451
Monument 720	329		453	Morse west base school	268	373	435
Monument 721	329		453	Mott	291		453
Monument 722	329		453	Moulstead	281	394	433, 447
Monument 728	329		453	Mound	282	396	447
Monument 729	329		453	Mountain	278	390	445
Monument 730	329		453	Mount Merritt	263		431
Monument 731	329		453	Mouse (North Dakota,			
Monument 733	329		453	Bottineau County)	289		452
Monument 740	329		453	Mouse (North Dakota,			
Monument 742	329		453	Divide County)	286	404	450
Monument 745	329		453	Mouse River church	269	375	436
Monument 752	329		453	Mowbray	260	357	436
Monument 753	329		453	Mowbray elevator	271	377	436
Monument 758	329		453	Moyie	255	341	431
Monument 761	329		453	Muchuck	311	426	443
Monument 764	329		453	Muckamuck Lookout	263	362	429
Monument 765	329		453	Mud	283	397	448
Monument 766	329		453	Mundy	306	422	442
Monument 767	329		453	Murray	280	393	446

# INDEX TO TRIANGULATION AND TRAVERSE STATIONS

469

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	Page	Page	Page		Page	Page	Page
Muskeg	262	361	437	P	297	417	439
Mussetter	256	343	431, 432	Palmer	301	420	440
Myncaster	302	420	440	Parch	307	423	442
N	297	417	439	Paris	263, 274	362	430, 441
N. 267	282	397	448	Parke	254	335	428, 438
N. 268	282	397	447	Parker	255	340	430
N. 276	282	396	447	Pasture	284	400	449
N. 286-A	281	394	447	Patrice	298	418	440
Nash	293	412	455	Peaked Butte	258	350	433, 434
Nashliun	257	347	433	Pearson	272	379	439
Nat	286	403	450	Pebble	284	399	448
Neche	292	411	437, 454	Peg	278	389	445
Neche (G. S. of C.)	261	358	437	Pembina	261	359	437
Neche east base	293	411	454	Penny	302	420	440
Neche west base	293	411	137, 454	Percee	287	405	451
Neil	283	399	448	Perella elevator	268	373	435
Nelson (British Columbia)	306		442	Perry	309	424	442
Nelson (North Dakota)	288		451	Pete	304		442
Nemo	299	418	440	Peterson	326		451
New	277	387	444	Peterson (G. S. of C.)	259	353	435
New (U. S. C. & G. S.)	257	346	432	Pike	276	386	444
Nice	283	398	448	Pilot Mound	261	357	436
Nick	282	397	448	Pilot Mound school	270	376	436
Ninga	290	408	452, 453	Piney	262, 294	360	437, 456
Ninga church	270	375	436	Pinhorn	256	346	432
Ninga H	328	356	452, 453	Pinto	287		451
Ninga H (G. S. of C.)	260	356	436	Pleasant	287		451
Nooksack	272	379	439	Pleasant Valley church	266	370	434
Noon	282	397	447	Plentywood	258	351	434
Norge	259	352	434, 435	Plow	286	405	451
Norge school	266	371	434	Plum	292		454
North	296	416	439	Plum Coulee	261	358	437
North Divide	276	386	443	Point Edward	312	426	443
North Outlook	271, 292	377	437, 454	Point Roberts, 1934	272	378	438
North Pembina	291		454	Pole	283	398	448
Northport	275	382	442	Pole (G. S. of C.)	259	352	435
North Portal	287		451	Poley	298	417	440
North Star	261	358	436	Police (Alberta)	277	386	444
North Twenty Mile Look-out	263	362	429	Police (Montana)	279	392	446
Northwest Angle=Turning Point 1	332		457	Poplar	283	351	434, 448
Nose	318		447	Poplar (G. S. of C.)	258	351	434
Numedahl	261	358	436, 437	Portal	259	354	435
Nupe	307	423	442	Portal chimney	268	372	435
O	297		439	Portal north base	287	406	451
Oak	292		454	Portal south base	287	406	451
Oertel	272	378	438	Porter	257	349	433
Offshore range mark (east side Boundary Bay)	272		438	Porthill	275, 308	383	442
Offshore range mark (west shore Point Roberts)	272		438	Post	291		454
Ogden N. W. base=Ray	283	399	448	Power	296	416	439
Ogden S. E. base	283	399	448	Princeton	273	380	440
Old Man	257	347	433	Prise	290	410	453
Olga church	271	378	436, 437	Prox	308		442
Olie	260	356	436	Pugsley & Simpson	279	391	445
Olsen	285	402	450	Pull	284	399	448
Orleans	293	412	456	Purcell	275	384	443
Oroville	255	338	429	Purves elevator	270	376	436
Oslo church	266	370	434, 435	Q	297	417	439
Osoyoos	274	380	440	Qua	307		442
Osoyoos north base	255	339	429, 440	Quantock	258	350	434
Osoyoos south base	255	338	429, 440	Quartz	316	427	444
Otness	299	418	440	Rabbit	281	395	447
O'Toole	255	340	430	Rail	305	422	442
Otto	304	421	441	Rain	316		444
Out	284	400	449	Rainbow Peak	263		431
Owl	275	382	441	Raley	280	393	446
Oxbow	287		451	Ram	260	356	436
Oxbow church	268	373	435	Rambo	300	419	440
				Range mark, offshore, east side Boundary Bay	272		438
				Range mark, off west shore Point Roberts	272		438



Station	Position	Description	Sketch	Station	Position	Description	Sketch
	Page	Page	Page		Page	Page	Page
Range mark, on west shore Point Roberts	272		438	Salmon Ridge	306		442
Rankin	314	426	444	Salol	294	414	456
Rapdan	257	348	433	Sam	311	425	443
Ray=Ogden N. W. base	283	399	448	Sandy	294	414	456
Read	261	360	437	Sarles	291		453
Record	275	382	442	Sarles (G. S. of C.)	260	357	436
Red (Alberta)	278	389	444	Sarles school	270	376	436
Red (Washington)	296	415	439	Scandia school	269	375	436
Red barn	331		455	Scarpe	256	342	431
Red Mountain	312	426	443	Schnell	259	353	435
Red Top	306		442	School	288	403	451
Reference Monument 1	332		457	School= Ambrose north-east base	259, 285	353	435, 450
Reference Monument 2	332		457	Schrader	293	412	456
Rommel	273	337	429, 440	Scobey	283	398	448
Rommel (U. S. C. & G. S.)	254	337	429	Scott	311	425	443
Rhine	292		454	Scott (G. S. of C.)	260	356	436
Rhodes water tank	269	375	436	Semiahmoo Lighthouse	272		438
Richland	258	350	434	Senior	256	344	432
Ridge (Montana)	277	344, 387	432, 444	70-mile Butte	257	349	433
Ridge (North Dakota)	291	410	453	Sheep	278	390	445
Ridge (U. S. C. & G. S.)	256	344	432	Sheep (U. S. C. & G. S.)	254, 273	337	429, 440
Ridgeville	261	359	437	Sheep Creek	305		442
Rim (Alberta)	276	386	444	Shep (Idaho)	308	424	442
Rim (British Columbia)	298	417	440	Shep (Montana)	280	392	446
Rim (Saskatchewan)	318		447	Sherwood	288		451
Rita	262	361	437	Sherwood church	268	373	435
Rival	287	406	451	Shock	293	412	456
River	277	388	444	Shore range mark (west shore Point Roberts)	272		438
Roanwood	258	350	434	Short (Manitoba)	292		454
Robinson (Montana)	284	400	449	Short (Saskatchewan)	327		451
Robinson (Washington)	254, 273	337	429, 440	Short Creek	259	354	435
Roche	273	380	440	Shultz	293	412	455
Roche (G. S. of C.)	257	349	433	Sidley	274	381	440
Rock (British Columbia)	302	420	441	Signal	257	347	433
Rock (North Dakota)	289	407	452	Silver	296	415	439
Rocky	281	395	447	Silver Crown	305	422	442
Rocky Creek azimuth station	282		447	Similkameen	273	380	440
Rocky Creek north base	281	395	447	Simmons	288		451
Rocky Creek south base	281	395	447	Simpson	257	347	432, 433
Roland elevator	271	377	437	Sisters (U. S. C. & G. S.)	254	336	428, 429
Rolla	290	409	453	Sisters (U. S. G. S.)	272	336	428, 429
Rood	284	401	449	Sitcum	274	382	441
Roscoe	278	390	445	Skermo	285	402	450
Rose	284	400	449	Slesse	296	415	439
Roseau	294	413	456	Slim	282	396	447
Rosenfeldt elevator	271	378	437	Slow	262	360	437
Ross (Alberta)	256	343	431, 432	Smart	289		452
Ross (Montana)	258	351	434	Smith (Idaho)	275, 308	383	442
Ross (Saskatchewan)	286	405	451	Smith (Manitoba)	289		452
Ross east base	287	405	451	Smoky (Saskatchewan)	282	395	447
Ross west base	286	405	451	Smoky (Washington)	273	380	440
Roswell	275	383	443	Snow	280	393	446
Round	285	401	449	Snowflake school	271	376	436
Rounds	265, 280	368	433, 446	Snowy (British Columbia)	263, 273	362	429, 440
Ruin	285	402	450	Snowy (Idaho)	255	340	430, 442
Ryder	280	392	446	Sod	283	397	448
S	298	417	439	Sofa	276	386	444
S. 280	281	395	447	Soft	294	413	456
S. 282-A	281	395	447	Soft (G. S. of C.)	262	360	437
S-313	265, 280	368	433, 446	Son	302	420	440
Sack	307	423	442	Sophia	304		442
Saddle	308	423	442	Souris	288		451
Sage	281	395	447	Souris (G. S. of C.)	260	355	436
Sage (U. S. C. & G. S.)	257	346	432	Souris east base	289	407	452
St. John	260	356	436	Souris school	269	375	436
St. Johns	290	409	453	Souris west base	289	407	452
St. Leon church	270	376	436	South (British Columbia)	296	416	439
St. Mary	277	386	444	South (Montana)	277	388	444
St. Mary north base	277	387	444	South Divide	276	386	443
St. Mary south base	277	387	444	South Fork	306	422	442

# INDEX TO TRIANGULATION AND TRAVERSE STATIONS

471

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	Page	Page	Page		Page	Page	Page
South Junction	262	360	437	Torquay elevator	267	372	435
South Outlook	271, 292	377	437, 454	Tower Mountain	263	362	429
South Pembina	291		454	Town	272		439
South Portal	287	406	451	Track	264, 277	364	432, 444
Sowers	281	394	447	Trap	272	379	438
Sowers N. W. base	281	394	447	Trees	258	352	434, 435
Sowers S. E. base	281	394	447	Trout	259	355	435
Speer	310	425	443	T. S. B. M. No. 31	265	369	433
Spencer	279		445	Tubs	265, 280	368	433, 446
Sperling elevator	271	377	437	Tuchuck	256, 276	342	431, 443
Spider	277	387	444	Turning Point 1, Lake of the Woods	332		457
Sprague	262	361	437	Turret	299	418	440
Spring	283	399	448	Turtle	289		452
Spur	255	339	429, 430	Twin Butte church	267	371	435
Spy	287	406	451				
Spy (G. S. of C.)	259	354	435	Uffurd	322		448
Stack	263, 277	363	431, 444	Ulan	324	427	449
Stags Leap	306	422	442				
Star	291		453	Vedder	295	414	439
Star Mound	291	357	436, 453	Velvet	305		442
Star Mound (G. S. of C.)	261	357	436	Verdigris	256	345	432
Starvation	276	386	443	View	284	401	449
States	261, 293	359	437, 455	Vita	294	413	456
Steele	289		452	Vita (G. S. of C.)	261	359	437
Steele 2	289	407	452				
Stoney	262, 294	361	437, 457	Wales	291		453
Strode	264, 279	366	432, 445	Wales church	271	377	436
Strong	280	393	446	Walhalla	261	358	437
Stuartburn	261	359	437	Wall	292		454
Sub	331		455	Walls	299	419	440
Sub-265	312			Walsh	281	394	447
Sub-269	312			Wam	276	385	443
Sumas	254	336	428, 439	Wampum	294	414	456
Sumas Mountain	295	414	439	Waneta	305	422	442
Summit (British Columbia)	255	340	430	Warroad north base (Mon. 909)	262, 294	361	437, 456, 457
Summit (Manitoba)	260, 289	356	436, 452	Warroad south base	262, 294	361	437, 456
Summit school	266	371	434, 435	Waskada church	269	374	436
Sundown	294	413	456	Waters	281	394	447
Sunkist	256	342	431	Waterton	276	386	443, 444
Suran	294	413	456	West	313		444
Swamp	262	360	437	West Butte	256	345	432
Sween	289		452	West Cherry	265, 280	368	433, 446
Sweetgrass	264	365	432	Westhope	260	355	435
				West Willow	262	361	437
T	298	417	439	Wet	293	412	455
Table	277	388	444	Whatcom (U. S. C. & G. S.)	254	335	428, 439
Table Butte	258	350	434	Whatcom (U. S. G. S.)	272	335	428, 439
Tangedal	258	352	434	Wheat	286	403	450
Taylor	301	420	440	White (Montana)	280	393	446
Taylor (G. S. of C.)	260	357	436	White (Saskatchewan)	284	401	449
Tees	280	393	446	White (Washington)	263, 274	362	430, 441
Telford	280	393	446	Whitetail	258	351	434
Temple	260	356	436	Whitewater	257	349	433
Templeman	258	350	434	Whitworth	297	417	439
Tennant	264, 278	365	432, 445	Wideview	258	349	433
Thibedeau	264	367	433	Wig	276	385	443
Thoeny	258	350	433, 434	Wild	284	401	449
Thompson	284	401	449	Willow Creek	279	392	446
Thornhill school	271	377	436	Willow 1913	294		456
318	280	392	446	Wills	291		453
373-S	277	387	444	Windy (Manitoba)	291		454
Thunder	262	361	437	Windy (Montana)	282	396	447
Thurston	295	415	439	Windy 1935 (Washington)	273	380	440
Tiffany (U. S. C. & G. S.)	255	337	429	Windygates elevator	271	377	436
Tiffany (U. S. G. S.)	273	337	429, 440	Wink	292		454
Tippie	274	381	440, 441	Winlaw	288		452
Toad	272	379	439	Winter	288		451
Tod	262	360	437	Wood (British Columbia)	308	423	442
Todd	280	392	446	Wood (Minnesota)	294	413	456
Toledo	279	391	446				
Tolley elevator	268	373	435				
Tolstoi	261	359	437				

Station	Position	Description	Sketch	Station	Position	Description	Sketch
	<i>Page</i>	<i>Page</i>	<i>Page</i>		<i>Page</i>	<i>Page</i>	<i>Page</i>
Wood (Montana).....	275	384	443	Yaak.....	275	341	431, 443
Wood Lookout.....	310	425	443	Yaak (U. S. C. & G. S.)..	255	341	431
Worth.....	290	408	452	Young.....	276	384	443
Wright.....	290		453	Zemper.....	284	400	449
Wylie.....	265	369	433				

# GENERAL INDEX

A		Page		Page
Agreement of the Commissioners:			Brown, Private Michael, grave of.....	37
acceptance of work done in 1901 and 1902..	25		Brundage, Frank H., topographic engineer.....	161
boundary vista.....	27		Bryan, W. J.....	18
division of field work.....	25		Burkhart, H. F., field work.....	59
engraving and printing of maps.....	28			
geodetic location of monuments.....	27		C	
location of boundary west of the Rocky Mountains as a series of straight-line courses.....	25		Calkins, Frank C., field work.....	44
monuments and monumenting.....	27		Cameron, Capt. Donald R., appointed Commissioner in 1872.....	215
numbering of monuments.....	27		Camp, F. A., field work.....	53, 64
preparation of maps.....	27		Campbell, Archibald:	
publication of final report.....	28		appointed Commissioner in 1857.....	194
terms of treaty of 1908, east of the Rocky Mountains.....	26		appointed Commissioner in 1872.....	215
Appendix I, Historical sketch.....	163		report on boundary west of the Rocky Mountains lost.....	29, 196
Appendix II, Boundary treaties prior to 1908..	183		Certificate to official description of the boundary.....	160
Appendix III, Original surveys and demarcation.....	194		Chisholm, D. F.....	162
Appendix IV, Elevations along the 49th parallel boundary.....	218		Clark, Capt. William.....	179
Appendix V, Geographic positions and descriptions of triangulation and traverse stations..	253		Clarke, H. C. O., field work.....	102, 103
Appointments of the Commissioners.....	16		Clark Fork (Pend-d'Oreille River).....	45
Astor, John Jacob.....	180		Clunn, T. H. G., field work.....	97
			Cochrane, M. F., field work.....	95
			Colby, Bainbridge.....	19
			Cole, W. B., field work.....	93, 94, 96
			Commissioners, appointments of.....	16
			Conclusion.....	161
			Conferences and agreements of the Commissioners of 1857-69.....	198
			Control:	
			horizontal.....	114
			vertical.....	128
			Convention of 1818, articles II and III, text..	187
			Convention of 1827, articles I, II, and III, text..	188
			Cook, Capt. James.....	169
			Cooperation:	
			Customs and immigration officials.....	161
			Geodetic Survey of Canada.....	161
			United States Coast and Geodetic Survey..	161
			United States Geological Survey.....	79, 161
			United States Lighthouse Service.....	110
			Courtman, Charles, field work.....	92, 98
			Craig, J. D., appointment as Commissioner....	20
			D	
			Daly, R. A., geologist.....	35, 38, 48, 50
			Davies, T. A., field work.....	48, 50, 61
			De Coeli, E. T., field work.....	38,
				50, 61, 73, 86, 89, 92, 94, 96
			Description and definition of the boundary.....	143
			Descriptions and elevations of bench marks....	218

	Page		Page
Descriptions of triangulation and traverse stations:		Field operations—Continued.	
explanatory note.....	333	1904, Skagit River to summit of the Rocky Mountains—Continued.	
first-order scheme.....	334	United States parties—	
first-order scheme, supplementary points...	362	at Gateway, Mont., and Laurier, Wash.....	64
major schemes.....	378	Kettle River to Similkameen River.....	62
minor schemes—		Porthill, Idaho, to summit of the Rocky Mountains.....	63
Georgia Strait to summit of the Rocky Mountains.....	414	Skagit River to Similkameen River.....	65
summit of the Rocky Mountains to Lake of the Woods.....	426	1905, detached sections west of the Rocky Mountains.....	70
special index.....	458	Canadian parties.....	70
Discrepancies between old astronomic stations and true 49th parallel.....	212	United States parties.....	73
Dunaway, Horace, field work.....	42	1906, Point Roberts to the Skagit River....	79
Dunsmuir, James.....	23	1907, Point Roberts to the Skagit River; and joint inspection west of the Rocky Mountains.....	86
E		Canadian parties.....	86
East India Company.....	170, 174	joint inspection party.....	89
Elevations and descriptions of bench marks....	218	1908, conclusion of work west of the Rocky Mountains; and from Coutts, Alberta, 100 miles eastward.....	92
Everall, Stanley, field work.....	73, 86, 89	east of the Rocky Mountains.....	93
Explorations:		west of the Rocky Mountains.....	92
American.....	172, 176, 179	1909, summit of the Rocky Mountains to Frenchman Creek.....	93
British.....	169, 174, 177, 179	Canadian party.....	94
French.....	165	United States party.....	95
Portuguese.....	171, 173	1910, North Fork of Milk River to the Turtle Mountains.....	96
Spanish.....	168, 173	Canadian party.....	96
F		United States party.....	96
Field operations:		1911, Middle Fork of Poplar River to Red River.....	98
agreement of the Commissioners.....	25	Canadian party.....	98
outline.....	34	United States party.....	99
1901, reconnaissance west of the Rocky Mountains.....	35	1912, Red River to Lake of the Woods; meridian line; additional base lines.....	100
Canadian parties—		1913, the meridian line.....	102
eastern party.....	38	1914, numbering the monuments.....	103
western party.....	36	1917 to 1922, completion of field work under treaty of 1908.....	104
United States parties—		1926 and later; maintenance under treaty of 1925.....	106
astronomic and topographic parties.....	39	"Fifty-four forty," claims to territory south of..	188
first geologic party.....	42	Finlay, George I., field work.....	46
second geologic party.....	44	Flynn, H. F., field work.....	42
third geologic party.....	45	Forsythe, O. R., field work.....	93, 94
1902, reconnaissance west of the Rocky Mountains.....	47	Forty-ninth parallel, early claimed by United States as boundary.....	167
1903, South Fork of Salmon River to summit of the Rocky Mountains.....	48	Franklin, A. E., field work.....	59
Canadian party, west of Porthill, Idaho.....	48	French, O. B., field work.....	42, 102
United States parties—		Fulford, Fred, field work.....	98
Flathead River to summit of the Rocky Mountains.....	54	G	
Gateway, Mont., to Wigwam River.....	51	Geodetic Survey of Canada:	
Porthill, Idaho, to Gateway, Mont. Wigwam River to Flathead River.....	57	cooperation.....	161
1904, Skagit River to summit of the Rocky Mountains.....	59	first-order control.....	109, 110
Canadian party, Kettle River to Porthill, Idaho.....	59		

Geographic positions:		L	
boundary monuments.....	Page 144		Page
triangulation and traverse stations—		Lake of the Woods, Northwesternmost Point of.....	137
explanation of tables.....	253	Leveling, bench marks, elevations and descriptions.....	218
first-order scheme.....	254	Lewis, Capt. Meriwether.....	179
first-order scheme, supplementary points.....	263	Linegar, E. J., field work.....	93, 94, 96, 98
major schemes.....	272	Lions Clubs monument.....	106, 107, 125
minor schemes—		Loder, E. H., field work.....	59
Georgia Strait to summit of the Rocky Mountains.....	295	Louisiana Purchase.....	164
summit of the Rocky Mountains to Lake of the Woods.....	313	Lynt, R. K., field work.....	97, 99, 102, 103, 105
special index.....	459		
George, King of Great Britain:		M	
appointment of British Commissioner.....	20, 21	Mackenzie, Alexander.....	178
Goodwin, J. L., field work.....	93, 94	Mackie, F. H., field work.....	89
Granger, F. D., field work.....	93, 94, 96, 98	Macoun, J. M., assistant naturalist.....	38, 48, 50
H		Magnetic party of United States Coast and Geodetic Survey attached to boundary survey, 1905.....	73
Hagar, W. V., field work.....	102	Maintenance of the boundary under the treaty of 1925, field operations.....	106
Hand, E. R., field work.....	102	Maps and reports of Commission of 1857-69.....	208
Hanssen, Reinert, field work.....	53	Maps and reports of Commission of 1872-76.....	217
Hawkins, Capt. (Col.) John S.:		Maps, official boundary:	
appointed Commissioner in 1858.....	195	agreement of the Commissioners.....	27
information regarding early survey obtained from his correspondence.....	29	Commissioners' certificate.....	135
report of.....	202	description.....	134
Hay, John.....	17	distribution to libraries.....	136
Hefty, J. G.:		scale of publication.....	135
field work.....	59, 70, 79, 105, 106	Martin, E. R., field work.....	53, 64, 76, 95, 97, 99, 103, 105
topographic engineer.....	161	McArthur, J. J.:	
Hill, Jesse:		appointment as Commissioner.....	19
engineer to the United States Section of the Commission.....	161	field work.....	38, 47, 61, 73, 86, 89, 93, 94, 96, 98
field work.....	99, 102, 103	McArthur, J. W., field work.....	38, 73
Historical sketch of early explorations.....	163	McDiarmid, S. S., field work.....	73, 86, 89
bibliography.....	182	McGee, John J.....	17
Holden, C. A., field work.....	59	Menzies, J. W., field work.....	98
Hoover, Herbert, appointment of United States Commissioner.....	20	Miller, A. M., field work.....	64
Horizontal control.....	114	Missouri Fur Company.....	179
Hudson's Bay Company.....	165, 166, 181	Monument 1, description.....	123
I		Monuments:	
Index to triangulation and traverse stations.....	459	agreement of the Commissioners.....	27
Ingersoll, J. N., field work.....	106	description.....	118
Inspection of field work.....	89, 92	geographic positions.....	144
International Lions Clubs monument.....	106, 107, 125	number.....	115
Introduction.....	XIII	numbering of.....	89, 90, 103
J		recovery of original.....	29, 30, 32
Jay Treaty (1794), article IV.....	184	types.....	115
Jones, E. Lester, appointment as Commissioner.....	19	Monuments and monumenting.....	115
K		Moor, D. F. C., field work.....	95
Kendrick, William, field work.....	76	N	
King, Dr. W. F., appointments as Commissioner.....	16, 18	Near, W. P., field work.....	86
Klotz, Dr. Otto.....	197	Nelson, John:	
Kootenai (Kootenay) River.....	36	death.....	63
		field work.....	53, 64
		Neuner, George, Jr., field work.....	79
		Neutral lands along the boundary.....	22
		Nootka Treaty.....	175



## 477

0







